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MELVILLE T. COOK, Editor.

SUPPLEMENTARY REPORT ON THE HETEROCERA OR MOTHS OF PORTO RICO

By *Wm. T. M. Forbes.*

THE INFESTATION OF YOUNG OKRA PODS BY PINK BOLLWORM IN PORTO RICO

By *George N. Wolcott.*

A NEW SPECIES OF ARISTELLIGER FROM NAVASSA

By *Chapman Grant.*

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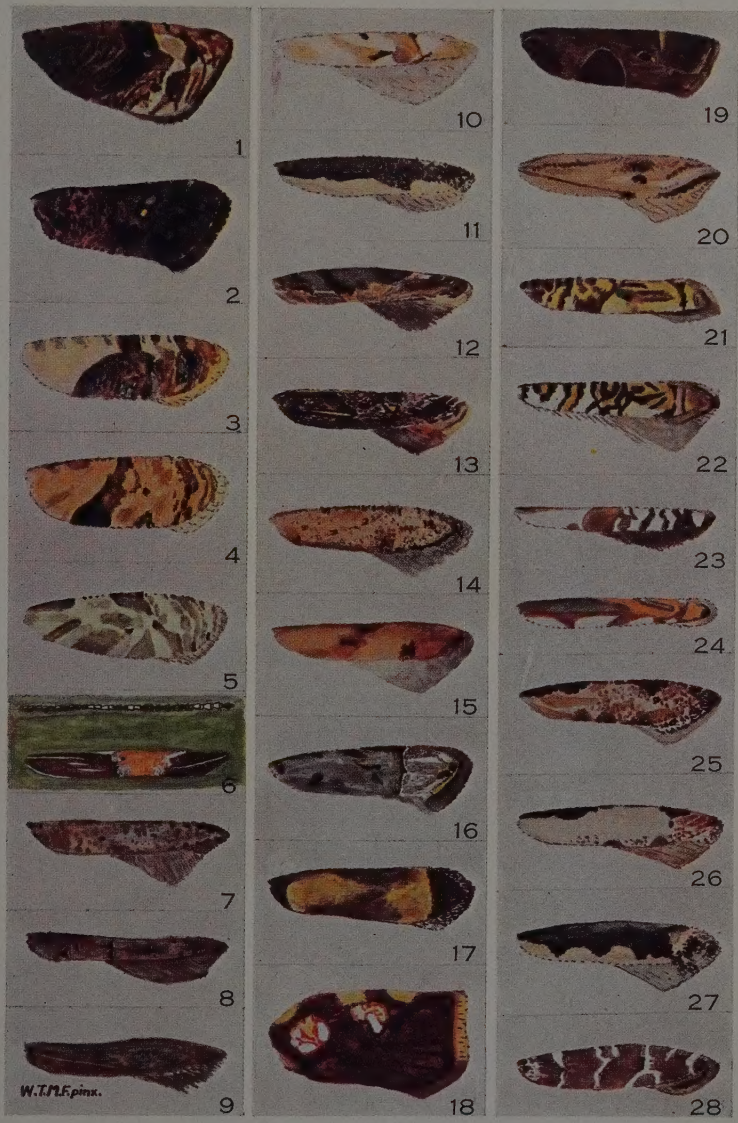

NEW MOTHS FROM PORTO RICO

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VOL. XV OCTOBER 1931 No. 4.

SUPPLEMENTARY REPORT ON THE HETEROCERA OR MOTHS OF PORTO RICO

By WM. T. M. FORBES, Cornell University, Ithaca, New York.

This report is an appendix to the revision of certain families of moths in the Scientific Survey of Porto Rico, vol. xii, no. 1, 1930, and includes the same families. It is based primarily on material in those families collected by the writer in the spring of 1930, and represents that material as fully as it has been worked up. I have also included a considerable number of records based on specimens collected by Leonard, Hoffman, Seín and Mills since my return, and sent up to me. Such material is duly credited in the text. The year-date is 1930 except as stated.

For convenience of reference I have made this paper uniform in style with the former report, and have put against each species the page-reference to the former paper. In the cases of additional species regular headings are used, and a key-bibliography.

The corresponding material in the Butterflies, Noctuidae, Geometridae and Pyralididae is being studied by Dr. Schaus and Mr. Watson, and will be incorporated in their reports on those families. A considerable number of other insects were taken more or less incidentally. A few of these have already been reported on by Dr. Curran, and the remainder, we hope, will be included in reports on the various groups of insects as they come out.

The material on which this report is based, including the holotypes, is in the Museum of the Department of Entomology of Cornell University. A second set, so far as possible, will be put in the U. S. National Museum. I have included a few records for Haiti from specimens collected by Mr. O. Fulda about the same time. These specimens are also in the Cornell collection. While the Haiti fauna is richer than that of Porto Rico and doubtless includes many things absent from the smaller island, part of these species will surely be found eventually in Porto Rico. We can now say that our knowledge of the Porto Rico Macrolepidoptera is well advanced, but in the micros, the large percentage of new species taken (some 50 in

all, not all in condition to describe) and of new records for the island, show that at least half of the island fauna is yet to be discovered. In the boring and leaf-mining genera, such as the Gracilariidae, Nepticula, and Phaloniidae, no doubt an even larger proportion is still unknown. There is need for much work in this field, and especially for rearing and life-history work.

I am much indebted to numerous people who have helped me in many ways in this survey, and especially to the Hon. C. E. Chardon, then Commissioner of Agriculture, to Dr. N. L. Britton and Mr. Wm. P. Kramer, then Chief Insular Forester, for personally conducting me to many entomologically rich spots on the island, and to Drs. M. D. Leonard and W. A. Hoffman, and Messrs. Francisco Seín, Jr., and A. S. Mills, for similar help and also for a great amount of material collected, not only while I was with them, but since. In working up the material I have had especial help from the Lepidopterists at the U. S. National Museum, and especially Mr. August Busck, but he is not responsible for the conclusions I have come to, and no doubt will disagree with several of them.

In the following pages the species are taken up in the order in which they appear in the former report.

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EUCHROMIIDÆ

Phoenicoprocta parthenii Fabricius (p. 20). Coamo Springs, April 24, 1930.

Nyridela chalciope Hübner (p. 22). Lares, December (Seín).

Cosmosoma auge Linnaeus (p. 23). Coamo Springs, Apr. 5–9; El Yunque, Mar. 29, Apr. 23. Lares, Sept. (Seín).

C. achemon tyrrhena Hübner (p. 23). All four specimens have the ground of the fore wing mainly orange; the males have the usual orange patch opposite the lower angle of the cell, and even in the female the base of cell Cu_1 is filled with orange; the form therefore, so far as Porto Rico is concerned, is a good race, and such specimens appear never to be taken on the mainland; but in Jamaica both forms are found. *C. bifenestratum* Dyar is a synonym of *tyrrhene*. Coamo Springs, Apr. 10, San Germán, Apr. 16, Cataño, Nov. (Rachel Dexter), Lares, Sept. (Seín).

Lymire flavicollis Dewitz (p. 24). Coamo Springs, Apr. 10, El Yunque, Apr. 22.

Horama panthalon Fabricius (p. 25). This species varies considerably and in part locally, and I believe the names *stoneri* Lindsey, and *serena* Schaus are no more than minor races. My specimens from San Germán, Apr. 16, 17, agree substantially with *stoneri* Lindsey, having a nearly solidly orange hind wing; specimens in the Experiment Station collection from Boquerón (labelled San Germán) are of a distinctly smaller and darker strain, while one from Petionville, Haiti (Fulda) is largely brown-black, and most nearly represents the type.

Correbidia terminalis Welker (p. 27). The race-name *continentalis* can hardly be held, as the Lares specimen reported below is darker even than normal continental specimens, and has a deep orange-red ground; the National Museum has similar specimens from Baracoa, Cuba. El Yunque, Mar. 29, Lares, Sept. 29 (Seín).

NOLIDÆ

Nola bistriga Möschler (p. 29).

Curiously enough all the known specimens of this and the following species (19 besides the two types of *bistriga*) are females. The markings of all my specimens are black and Hampson's figure of a type also suggests black markings, but the original description calls them brown. El Yunque, Mar. 29, Apr. 22, 23.

N. sinuata Forbes (p. 29). This species has close relatives in South America, especially an undescribed one which I took in Brit-

ish Guiana, but it appears to be distinct. Coamo Springs, Apr. 6–10. Cornell Univ., type No. 1031.

ARCTIIDÆ

Progona pallida Möschler. The black costal edge, used by Hampson to separate this species from *P. sadima* Schaus, of Brazil, is present in both, but the latter is a much larger and paler species, with the hind wing rather paler than the fore wing. *P. ignota* Schs. is correspondingly darker. The type of *pallida* was no doubt faded, as my fresh specimens are gray, while older ones become light brown. The species seems common in Porto Rico. San Germán, Apr. 16, 17, El Yunque, Mar. 28, Apr. 22, 23, Dorado, May 30 (Hoffman), Lares, July 28 (Leonard), Dec. (Seín).

Mulona nigripuncta Hampson (p. 33). San Germán, Apr. 17, Palmas Abajo, June 23 (Hoffman), Lares, July 28 (Leonard).

Afrida charientisma Dyar (p. 34). The two specimens presumably represent the species reported doubtfully by Möschler as *A. tortriciformis* on the basis of a poor specimen; the latter can be recognized by its modified male hind wings. El Yunque, Apr. 22.

Eupseudosoma involutum Seppe (p. 34). Lares, Dec. (Seín).

[Robinsonia Grote

Similar to *Eupseudosoma,* but fore wing with M_3 arising well before end of cell, hind wing with R and M_1, $M_2 + 3$ and Cu_1 stalked. Markings normally, as in the following species, of brown bands on a white ground.

Robinsonia formula Grote

1865. *Robinsonia formula* Grote, Proc. Ent. Soc. Phil., v, p. 241, pl. iv, fig. 3.
1901. *Robinsonia formula* Hampson, Cat. Lep. Phal. iii, p. 13.
1919. *Robinsonia formula* Strand, Lep. Cat. xxii, p. 3.
1921. *Robinsonia formula* Seitz, Macrolep. World v, p. 343.
(not *R. formula* Druce, Biol. Cent.-Am. Lep. Het. i, p. 117).

Fore wing less than 2½ times as long as wide. White, fore wing with brown borders, and a diagonal stripe across it.

Cuba. Haiti; Petionville, May–June (Fulda).]

Ammalo insulata Walker (p. 35). Cataño, Apr. 21. Haiti: Petionville, May–June, common (Fulda).

Phegoptera bimaculata (p. 36). I have lately received this spe-

cies from Jamaica, which confirms the probability of the Porto Rico record; previously I had not seen the species from the West Indies.

Microdota Dognin

Ocellus well developed; male antenna broadly pectinate, but short and weak (in the P. R. species); palpus moderate, oblique; hind tibia with end-spurs only. Fore wing with normal venation, without accessory cell; R_2 typically free, in the P. R. species shortly stalked; hind wing with R and M_1 stalked, M_2, M_3 and Cu_1 well separated at origin. Scaling very thin, with wings translucent.

The present species looks almost exactly like the type, *M. lenistriata* Dognin, but has much weaker antennae and stalked R_2. The pattern is pactically identical. It will key to Halysidota, but it is very much smaller and weaker, looking like a Lithosiid or Psychid.

Microdota hemiceras new species

Male antenna much shorter than in *M. lenistriata* but with about the same number of segments (30), hardly more than ⅓ length of fore wing, the pectinations shorter and weaker. Clay color dusted with fuscous, the lighter color on the fore wing showing as innumerable semiconfluent rounded dots on the fuscous ground, on the hind wing covering most of the surface; the antenna with a few irregularly scattered fuscous segments on shaft only; head and dorsum similar, but less distinctly flecked, also fore legs and middle and hind tibiae and tarsi, the remainder of under side of body and legs of the clay color only. Fore wing with a blackish shade along lower discocellular vein, faintly extended along Cu to origin of Cu_2. Expanse 16mm. (type) to 25mm. (paratype).

Porto Rico: San Germán, Apr. 16 (type) and Coamo Springs, Apr. 4 (paratype). Cornell University, type no. 1081.

Halysidota cinctipes Grote (p. 36). Lares, Dec. (Seín); a curious dark and suffused form, possibly representing a new subspecies.

Calidota strigosa Walker (p. 37). Coamo Springs, Apr. 9.

Ecpantheria icasia icasia Cramer (p. 37). San Germán, Apr. 16, El Yunque, April. 23, Jájome Alto, June 18 (Hoffman), Lares, July 28 (Leonard).

Utetheisa ornatrix Linnaeus (pp. 38–40). Two races of this species overlap in Porto Rico, but any one colony appears normally to be almost wholly of one them, with a few intermediates and odd specimens of the other. The colonies examined were distributed as follows:

Dominantly *U. o. ornatrix*

Hatillo; Aguacate (Aguadilla); Puerto Real and Salinas (Leonard), Vieques Id. The Vieques Island colony had several red

specimens with the reduced black spotting of typical *ornatrix*, a particularly striking form.

Dominantly *U. o. stretchii* Buttler

Isabela, Río Piedras, Pueblo Viejo, Coamo Springs, San Germán. A few of the Río Piedras females had red-tinted hind wings and might be considered transitional to the *venusta* and *bella* forms which occur farther west.

[*U. o. venusta* Dalman

Freres, Haiti (Fulda). The usual Cuban form.]

PERICOPIDÆ

Hyalurga vinosa Drury (p. 42). Río Piedras, Apr. 4, Coamo Springs, Apr. 4, 5.

AGARISTIDÆ

Tuerta sabulosa Boisduval (p. 43). San Germán, April 16.

NOTODONTIDÆ

Rifargia haitia Schaus. Petionville, Haiti, June 13 (Fulda).]

SPHINGIDÆ

Herse cingulata Fabricius (p. 50). Puerto Real, Vieques Id., Ap. 28, 29; July 9 (Leonard).

Cocytius antaeus antaeus Drury (p. 52). Hato Rey, Mar. 31 (Fernando Chardon).

Phlegethontius sextus jamaicensis Butler (p. 53). Puerto Real, Vieques Id., Apr. 28.

[*P. brontes cubensis* Grote. Haiti: Petionville, June 26 (Fulda).]

P. brontes smythi Clark (p. 54). Coamo Springs, Apr. 7, 10; San Germán, Apr. 17.

Protambulyx strigilis Linnaeus (p. 54). Coamo Springs, Apr. 7.

Erinnys ello Linnaeus (p. 58). Coamo Springs, Apr. 6, Puerto Real, Vieques Id., July 8 (Leonard); Haiti: Petionville, June 1 (Fulda).

E. obscura obscura Fabricius (p. 59). Puerto Real, Vieques Id., July 9 (Leonard). Haiti: Petionville, June (Fulda).

[*E. guttularis* Walker. Petionville, Haiti, June 1 (Fulda).]

Pachylia ficus Linnaeus (p. 60). Hato Rey, Mar. 31 (Fernando Chardon), Puerto Real, Vieques Id., Apr. 28, 29.

Epistor lugubris Linnaeus (p. 61). Lares, Dec. (Seín).

Xylophanes tersa Linnaeus (p. 68). Coamo Springs, Apr. 5, 7, Cataño, Apr. 21, Puerto Real, Vieques Id., Apr. 28, 29; July 9, (Leonard).

X. pluto Fabricius (p. 69). Coamo Springs, Apr. 6.

Celerio lineata lineata Fabricius (p. 69). Coamo Springs, Apr. 6–10, Cataño Apr. 21, Aguirre, Apr. 15.

Epiplemidæ

Nedusia excavata Möschler (p. 71). Jájome Alto, June 18 (Hoffman). Haiti: Petionville, May–June (Fulda).

Epiplema ineptaria Möschler (p. 72). Coamo Springs, Apr. 9–10, San Germán, Apr. 17, Dorado, June 13 (Hoffman). This species shows a well-marked sexual dimorphism; the male is grayer, especially on the fore wing, and the hind wing is rounder and appears to have lost vein Cu_2.

Hyblæidæ

Hyblæa puera Fabricius (p. 73). Lares, Sept. 29 (Seín).

Thyridæ

[*Rhodoneura myrsusalis* var. *immaculalis* Möschler (p. 74). Haiti: Petionville, June 13 (Fulda).]

Pterophoridæ

Adaina bipunctata Möschler (p. 75). Coamo Springs, Apr. 4–10; El Yunque, Apr. 23, Santurce, Mar. 23 (Hoffman), Dorado, May 30 (Hoffman); Aguirre, Apr. 2–3, 1931 (Leonard and Mills); Puerto Real, Vieques Id., Apr. 29.

A. participata Möschler (p. 76). Coamo Springs, Apr. 9, Puerto Real, Vieques Id., Apr. 28; Lares Sept. 20 (Seín).

P. basalis Möschler (?) (p. 77). Lares, Sept. 20 (Seín); a very poor specimen, but much too large for any other species known to the region.

P. inquinatus Zeller (p. 77). Coamo Springs, Apr. 4.

Marasmarcha pumilio Zeller (p. 78). San Germán, Apr. 17. Larva on Meibomia in Cuba (Busck—N. M.). Several other specimens are much paler than *pumilio* as determined by Barnes and Lindsey and have fewer black scales in the fringes. They resemble Meyrick's figure of *liophanes*, treated by Barnes and Lindsey as a synonym of *pumilio*. Coamo Springs, Apr. 5, Cataño, Apr. 21, Puerto Real, Vieques Id., Apr. 28–29.

Trichoptilus defectalis Walker (p. 78). Coamo Springs, Apr.

4–10, Aguirre, May 22 (Leonard), Apr. 2–3, 1931 (Leonard and Mills); Puerto Real, Vieques Id., Apr. 28–29.

Platyptilia pusillidactyla Walker (p. 80). Coamo Springs, Apr. 4–10.

Platyptilia crenulata Barnes and McDunnough

1913. *Platyptilia crenulata* Barnes and McDunnough, Contr. Nat. Hist. Lep. ii, p. 185, pl. iii, fig. 8.

1921. *Platyptilia crenulata* Barnes and Lindsey, Contr. Nat. Hist. Lep. iv, p. 316, pl. xli, fig. 15, pl. l, fig. 5.

Reddish brown, with white subterminal line across both lobes of fore wing, a triangular blackish shade before subterminal line in the first lobe, and another before the notch. Base and cell also with dark and whitish scaling. Third feather of hind wing with a triangular scale-tuft *near the apex* and numerous large black spatulate scales for most of its length. Abdomen with middorsal black spots defined with white on posterior segments. 13 mm.

Florida, Arizona, South California. P. R.: Coamo Springs, Apr. 4. The specimen is rubbed but agrees in essential characters with a cotype of this species.

ORNEODIDÆ

Orneodes eudactyla Felder (p. 80). Coamo Springs, Apr. 4, 10.

TORTRICIDÆ

Subfamily TORTRICINAE

Archips species (p. 83). The specimen in the Experiment Station collection is imperfectly expanded, but agrees with *A. jamaicana* so far as can be made out.

Paratorna rotundipennis Walsingham (p. 83). Fore wing with dark stripes from middle of costa to lower angle of cell, and across apex. Cu_2 and 2d A closely crowded at anal angle, 1st A anastomosing with 2d A. Expanse 10 mm. Boquerón ("San Germán") in Experiment Station collection.

Coelostathma parallelana Walsingham (p. 84). El Yunque, Mar. 30; Lares, Sept. (Seín). Too poor for certainty but no doubt this species.

Drachmobola insignitana Möschler (p. 84). Three females are considerably darker than implied by Möschler's description, but fit well enough. The male is strikingly different. Antenna strongly fasciculate-ciliate. Fore wing creamy, the mixed light buff and blackish reticulation conspicuous only on outer half of wing and

middle of inner margin; a diffuse dark antemedial spot on inner margin and some dark discal striæ opposite it, two contrasting blackish patches on costa, the first at two-fifths, the other half way between it and apex, both rounded, but with the basal side obliquely cut off, corresponding to the two oblique bands of the female. Some black costal points at tips of veins outwardly. Hind wing conspicuously reticulate with fuscous. In two of my females the two costal spots are traceable, in the other all markings are obsolescent.

El Yunque, Mar. 29 (male), Apr. 22, 23 (female); Jájome Alto, June 18 (Hoffman).

Sparganothis flavedana Clemens (p. 85). Antillean specimens are consistently very largely tawny, and represent a good race at least. Lares, Dec. (Seín).

Sparganothis saturatana Walker

1863. *Teras saturatana* Walker, List. Lep. Ins. B. M. xxviii, p. 294.
1912. *Sparganothis saturatana* Meyrick, Lep. Cat. x, p. 57.
1913. *Sparganothis saturatana* Meyrick, Gen. Ins. cxliv, p. 58.

Fore wing fawn, with brown reticulation and transverse lines toward outer margin. Hind wing orange. 18 mm.

This species differs from *S. effoetana* by the orange hind wing, from *S. flavedana* by the smooth fore wing and much larger size. The Porto Rico specimen agrees with a Panama specimen in the National Museum, collected by Busck and determined by Walsingham, but not so well with the original description and a figure in the National Museum of Walker's type.

Honduras, Panama. P. R.: Coamo Springs, Apr. 6.

Subfamily Olethreutinae

Olethreutes albimaculana Walsingham (p. 86) should read *albimacula*. The following reference should be added:

1914. *Olethreutes albimacula* Walsingham-Durrant, Biol. Cent.-Am. Lep. Het. iv, p. 251. (Central and South America).

O. canofascia Forbes (p. 86). Santurce, Mar. 25 (Hoffman).

O. hebesana Walker (p. 88), Coamo Springs, Apr. 4, 7; Puerto Real, Vieques Id., Apr. 29.

Olethreutes anthracana new species (Pl. XLII fig. 2)

The following species is not a true Olethreutes but will go with several South American species in a new genus. It has most of the characters of Olethreutes, except for some very aberrant features, but has the tufted hind tibiae of Phaecasiophora.

Head close-scaled, with a vertical depressed line in front. Palpi close-scaled, the third segment wider than long, inconspicuous; antennae shortly pubescent, simple; coxae and femora with masses of large spatulate scales, the middle and hind tibiae shaggy with masses of longer spatulate scales; no pencil seen on hind tibia. Thorax with thicker scaling behind but no real tuft; abdomen with narrow hair-like scales, and a dense terminal tuft, borne on the somewhat modified eighth segment, shaggy. Fore wing with accessory cell large, normal; R_3–R_5 approximate at base, R_2 widely separated, Cu_2 anastomosing with 1st A. Hind wing with R and M_1 merely approximate, Cu_2 from middle of lower side of cell but free from 1st A; anal region roughly scaled but not modified. Male genitalia heavily spined, of Olethreutes type (pl. XLV fig. 21); with cucullus rounded over and reduced, the sacculus also short, and most of the length taken up by the portion bearing the spine-clusters; cluster 1 very long, running along the ventral edge of the valve, with numerous heavy spines, cluster 2 a small group of weak spines hardly set off from its basal end; uncus flat and spatulate with a tuft of long hair; socii short hairy lobes, but a pair of large tufted membranous lobes at articulation of valves; penis unarmed (apparently, there might be deciduous spines). Eighth segment heavily chitinized, with a pair of shallow pockets bearing enormous tufts of several types of spatulate black hair-scales.

Head and thorax with palpi and scaling of antennae blackish; abdomen fuscous, anal tuft blackish. Fore wing marked with innumerable semiconfluent lighter spots on a blackish ground, the spots giving the general wing color, which is wood brown with crimson iridescense toward the base (exaggerated in the figure) and is coal black outwardly. Base solid blackish, extending out to a deeper black spot at basal angle; a solid black medial triangle below the cell, with one of its sides resting on the cell, and apex on inner margin; and a blackish shade extending up from end of cell. A contrasting yellow discal dot. Dark ground gathering to form a vague dark subterminal shade, parallel to outer margin; terminal line darker; fringe concolorous, faintly striped. Costa with a series of black spots, the four on outer two-fifths, larger. Hind wing light fuscous, the scales on the under side raised, but not so translucent as *Gymnandrosoma trachycerus*. 23 mm.

El Yunque, Luquillo National Forest, P. R., 1500–2000 ft. Apr. 23 at light. Holotype male, Cornell Univ., type No. 1035.

Gymnandrosoma Dyar

Palpi moderate, roughly scaled; thorax with a posterior tuft. Fore wing with most of the characters of Olethreutes, hind wing typically with M_2 and $_3$ parallel and well separated, but with M_2 strongly curved and approximated to M_3 at base in the Porto Rico species (*aurantianum* group). Male typically with strong sexual modifications of abdomen, wings and hind legs, not described in *desotanum*.

The two Porto Rico species belong to an aberrant group typified by the Brazilian *G. aurantianum*. They will run to Olethreutes in

the keys, though the male genitalic characters show their kinship to the other Gymnandrosomas. They may be distinguished from *O. hebesana* by the larger size and absence of lead gray areas on the fore wing.

Gymnandrosoma desotanum Heinrich

1926. *Gymnandrosoma desotanum* Heinrich, U. S. Nat. Mus. Bull. cxxxii, p. 72; pl. xxi, fig. 123 (female genitalia).

1931. *Gymnandrosoma desotanum* Heinrich, U. S. Nat. Mus. Proc. lxxix, art. 13, p. 6; pl. v, fig. 18 (male genitalia).

Surface mainly light wood-brown, in the form of double striations on a smoky brown ground, which appears solidly in a large median area, narrow at costa but much widened at middle of wing; and a rounded area before middle of outer margin, which tends to extend out toward costa. A white dot at end of cell. One pale stria at middle of outer margin more conspicuous than the rest, but short, followed by a bar of the dark ground. Terminal line barred wood brown and blackish. Hind wings and frings fuscous. Palpi "blackish fuscous slightly dusted with ochreous; upper edge sordid whi ...".

Everglades, Florida (U. S. A). Porto Rico: Puerto Real, Vieques, Id., Apr. 28. Heinrich has verified my determination and has compared the female genitalia with the type, finding no significant difference. Larva in red mangrove seed (Heinrich).

Gymnandrosoma trachycerus new species (pl. XLII fig. 1)

Male antenna densely ciliate-fasciculate, slightly thickened at base, but not notched. Hind tibia without pencil, abdomen without basal tufts. Fore wing with R_1 and $_2$ approximate at origin, parallel to near margin; R_3–$_5$ widely separate from them, but closely approximate at base to each other, R_5 curving away abruptly and R_3 and $_4$ separating more gradualy; M_2 and $_3$ approximate for a short distance; Cu_2 arising from cell at about ⅗. Hind wing with R and M_1 very shortly stalked, Cu_2 forking off far back toward base of wing, the weak 1st A becoming coincident with it outwardly; inner margin with a large lobe folded under, the edge of the fold reaching up to a row of rough scales along 2d A. Scaling somewhat sparse and raised though far less than in *Heligmocera*, the wing iridescent in a proper light.

Male genitalia (pl. XLV, fig. 22) of the Gymnandrosoma type, with short triangular uncus, closest to *G. aurantianum*, which has also similar secondary sexual characters, but is distinct.

Head and thorax fuscous, with some shining brown scaling, the face blackish; palpi blackish, with top and inner side of first two segments and base of third within, white, contrasting; antenna with under side warm yellow-brown, the scaling blackish, contrasting. Fore wing fuscous, striated and mottled with blackish, gathering to form a broad diffuse median fascia, angled sharply at end

of cell, where there are a few white scales; toward costa fairly defined and followed by a contrasting luteous patch, but below the angle followed by the fuscous ground color, which is crossed by an obscure narrow continuation of the luteous costal patch, extending to the anal angle. Outer margin fuscous and striate, with the striae tending to run obliquely out into the margin; fringe fuscous. The browner portions of the wing have a weak tawny bronze iridescence, most obvious along the costa. Hind wing translucent with slightly raised fuscous scaling, iridescent, toward the costa nearly transparent between the veins. 15 mm.

The caterpillar of the closely related *G. aurantianum* is a borer in oranges.

Porto Rico: El Yunque, 1500–2000 ft., at light, Apr. 22, 1930. Holotype no. 1036 in Collection of Cornell University.

Bactra verutana Zeller

1875. *Bactra lanceolana verutana* Zeller, Verh. z.-b. Ges. Wien, xxv, p. 247.
1924. *Bactra verutana* Forbes, Cornell Mem. lxviii, p. 470.
1926. *Bactra verutana* Heinrich, U. S. Nat. Mus. Bull. cxxxii, p. 84, figs. 47, 171, 346 (genitalia).

Clay color with some fuscous striation, especially on veins, and barring toward the margins; with blackish shade-spots, often obsolete, toward base and end of cell. 11–17 mm.

Larva on Cyperus.

Ontario to Alberta, south to Florida. P. R.: Coamo Springs, April 6–10, San Germán, Apr. 16, Cataño, Apr. 21; May (Leonard and Mills), July 24 (Leonard), San Juan, Aug. 26 (Mills), Aguirre, May 22 and Aug. 1 (Leonard): Puerto Real, Vieques Id., Apr. 28–29 (verified by male genitalia).

Episimus argutanus Clemens (p. 88). Puerto Real, Vieques Id., Apr. 29.

Anchylopera virididorsana Möschler (p. 89). San Germán, Apr. 16, Puerto Real, Vieques Id., Apr. 28–29.

Thiodia autochthones Walsingham (p. 89). San Germán, Apr. 16, Cataño, May 16 (Leonard and Mills). Aguirre, Apr. 2–3, 1931 (Leonard and Mills).

Eucosma strenuana Walker (p. 90). Coamo Springs, Apr. 4–9, Isabela, Apr. 24; Aguirre, Aug. 1 (Leonard); Puerto Real, Vieques Id., Apr. 29.

Crocidosema plebeiana Zeller (p. 91). Coamo Springs, Apr. 4–10, Cataño, Apr. 21, Isabela, Apr. 24, San Germán, Apr. 16, Aguacate, Aguadilla, Apr. 25, Santurce, Mar. 25 (Hoffman); Lares (Seín): Puerto Real, Vieques Id., Apr. 28–29. Common everywhere.

Strepsicrates smithianus Walsingham (p. 91). El Yunque, Apr. 22–23.

Heligmocera calvifrons Walsingham (p. 92), (pl. XLIII, fig. 1; pl. XLV, fig. 23). El Yunque, Mar. 29, Apr. 22–23. The American Museum has a series from Sánchez, Santo Domingo, containing a male; the male palpi are even more extraordinary than Walsingham's description would suggest; they are turned back over the top of the head, with the first segment extending up to the middle of the front, as in Acrolophus, and the third segment resting in a concavity in the vertex. In Walsingham's specimen they had evidently fallen forward.

Epinotia Hübner

Superficially closely similar to Eucosma and Thiodia, the costal fold variable; R_1 of fore wing arising nearer base of wing; male genitalia with uncus developed, socii triangular or strongly chitinized.

Epinotia unica Heinrich

1923. *Epinotia unica* Heinrich, U. S. Nat. Mus. Bull. cxxiii, p. 221, fig. 376 (male genitalia).

Male genitalia (pl. XLV, fig. 24) with a costal spine on valve. Palpus with two blackish spots on upper side of second segment. Fore wing dull ochreous, with irregular fuscous markings, the most definite being a dot at apex, and an oblique bar on inner margin. Expanse normally 13 mm.

Tennessee (U. S. A.). Porto Rico: Isabela, Apr. 24 (undersized).

PHALONIIDÆ

At the time when Walsingham published his catalogue of the West Indian micros, species in this family were much more inclusively defined than now. I very much doubt if either *P. bunteana* or *lepidana* is actually found in the West Indies. The former is probably based on my new *Saphenista bunteoides,* which according to some interpretations of the code would become the type of *Thyraylia* Walsingham. It completely lacks the pink of the true *bunteana* (as noted by Walsingham) and besides the distinct venation noted by Walsingham has the translucent hind wings with semierect scaling shared by all the Saphenistas known to me. It seems best to use Walsingham and Durrant's later name of *Saphenista* for this group.

The majority of Porto Rico species described as Phalonia, are Saphenistas, but *subolivacea* is a true Phalonia similar to *smeathman-*

niana, and *distigmatana* also is a true Phalonia. Besides the species listed below two or three others were taken in too poor condition to describe.

Saphenista Walsingham and Durrant

(*Thyraylia* Walsingham, material studied, but not named type)

Similar to Phalonia, but hind wing (fig. 2) with M_3 and Cu_1 short-stalked, or rarely connate or very shortly separate; translucent, with semi-erect scaling, at least between veins toward costa.

Besides the following species, some of those described as Phalonia should probably be transferred to Saphenista. For this reason a combined key is given.

KEY TO THE REGIONAL SPECIES OF PHALONIIDÆ

1. Hind wing with R and M_1 approximate at base, fore wing with Cu_1 and $_2$ parallel; mottled with tawny, dark brown and cream, the palpi dark; 13 mm. (*Hysterosia* ?)_____* *prolectana*
   Hind wing with R and M_1 stalked; smaller_____ 2
2. Median fascia definite and transverse, passing across cell near end, sometimes broadly interrupted over lower edge of cell; hind wing so far as examined with smooth scaling and M_2 and Cu_1 arising well apart (*Phalonia*)_____ 3
   Median fascia broad and confused, or diffused and not interrupted, or divided into longitudinal patches; hind wing with translucent areas between veins with semi-erect scaling, M_3 and Cu_1 very closely approximate, connate or short-stalked; see pl. XLIII, g. 2. (*Saphenista*) 6
3. Median fascia olive when fresh, narrow, continuous or slightly interrupted at upper (and lower) edges of cell_____*subolivacea*
   Median fascia broad and broadly interrupted over lower edge of cell, dark brown or blackish_____ 4
   Median fascia very broad and interrupted at Sc; chestnut brown with little or no black scaling_____*new species*
4. Fore wing with a brown sub-basal band as well as the brown on base of costa; ground buffy; outer part of wing mainly of the pale ground__ 5
   Fore wing with basal brown at costa only; ground silvery white, the apical part mottled with rusty brown and blackish_____* *ichthyochroa*
5. Neck and thorax dark brown; no apical markings mentioned___** *vicinitana*
   Thorax largely of the light ground; with strong costo-apical spot and other markings at outer margin of wing_____*distigmatana*
6. Base of fore wing brown, ending in a dark fascia; median fascia definite on costa, confused below, a distinct stripe across apex_____
   _____* *lacteipalpis* (St. Vincent)
   Fore wing dark at base only near costa_____ 7
7. Fore wing dark with a definite subterminal band across apex; costal part of median fascia pointing to end of cell or just beyond_____ 8
   Fore wing with apical markings suffused, no narrow and definite subterminal fascia; median fascia mottled brown, and continuous_____ 10

8. Median fascia composed of a costal and dorsal patches as in *distigmatana*, but with the venation of *Saphenista*, the dorsal patch blackish, much darker than the costal ..... *new species*
Median fascia represented by longitudinal patches below cell and below fold; markings olive 9
9. These two olive median patches oval, distinct and each edged above with black ..... *multistrigata*
These two patches confused, and only slightly defined with black scales in fold ..... *semistrigata*
10. Apical region solidly covered with a mixture of brown and black ..... *buntcoides*
Apical region mainly of the light yellowish ground 11
11. Median fascia defined with whitish before and beyond, and with whitish also in apical region ..... * *tectonicana*
Ground light dull ochre, without any white ..... *lepidulana*

Saphenista bunteoides new species (pl. XLII fig. 3)

1892. *Conchylis bunteana* Walsingham, Proc. Zool. Soc. 1891, p. 501. (?) (not *Conchylis bunteana* Robinson).

1897. *Thyraylia bunteana* Walsingham, Proc. Zool. Soc. 1897, p. 139. (?).

Head and thorax cream, the outer side of the palpus a little darker.

Fore wing with base to ⅖ of costa and less on inner margin cream, with some light brown shading and flecking on costa and faint 'pink gloss' in some lights, but without the decided pink of *Phalonia bunteana;* median area very narrow on costa, meeting it just beyond middle, widening to cover middle half of inner margin; chocolate and yellow-brown mixed, with a good deal of blackish scaling and a few raised lead-colored scales; the middle of the dorsal half mainly of the yellow-brown, so that the band appears forked, but with this patch less obvious than in the North American *P. hollandana* (from Vernonia.) Outer part mainly yellow brown on a cream base, flecked with lead color, with a subterminal band of darker brown mixed with blackish and some lead color, from ⅓ of costa to just above anal angle. The lead color strongest at end of cell, where it forms an ill-defined spot interrupting the postmedian area of the ground. Hind wing translucent fuscous, with some raised scaling, and dark fuscous gray veins. 10 mm.

This resembles the North American *Phalonia bunteana,* and even more closely the Vernonia species which has been mixed with *bunteana* (I believe *hollandana*), and I have no doubt it is the species at first mistaken for *bunteana* by Walsingham. The error was noted in Biol. Cent.-Am., Lep. Het. iv, p. 296. It must resemble *tectoni-*

* The species marked with an asterisk have not been studied and may be placed in the wrong genus.

cana Möschler, which is described as having a yellowish white hind wing.

Porto Rico: Coamo Springs Apr. 9, 10; female type and paratypes, Cornell Univ. no. 1037.

Saphenista lepidulana new species (pl. XLII fig. 4)

1897. *Thyraylia lepidana* Walsingham, Proc. Zool. Soc. 1897, p. 139. (?) (not *Phalonia lepidana* Clemens).

Closely similar to the preceding species, slightly smaller; thorax when fresh rather darker, rather ochreous, outer side of palpi more ochreous; ground of fore wing darker ochreous and more even, the darker yellow-brown more in the form of shades than striations, and with little black and no lead-color. Base with about three brown shades on costa and one on disc, median fascia representing only the basal portion of that of *S. buntcoides*, covering only the second fourth of the inner margin, its upper ⅔ nearly solid brown, but shaded heavily with black toward inner margin; the outer part of the fascia represented by a few black scales at lower angle of cell and on inner margin at ¾. Outer part of wing also deeper ochreous, the subterminal fascia distinct only on costal half, not always scaled with black; the anal angle with some confused mixed brown and black striations. Raised scaling of hind wing appearing as contrasting fuscous dusting. 9.5 mm.

Male genitalia (pl. LXV, fig. 25) with a small simple uncus borne on a large rounded tegumen, a larger simple bluntly pointed gnathos and costa of the valves roundedly prominent, but decidedly less angled than in *S. semistrigata*.

Porto Rico: Coamo Springs, Apr. 5–10, type and paratypes; El Yunque, Apr. 22, paratype; Puerto Real, Vieques Id., Apr. 28, paratype; Cornell Univ. type no. 1038.

Saphenista multistrigata Walsingham-Durrant

1914. *Saphenista multistrigata* Walsingham-Durrant, Biol. Cent.-Am. Lep. Het. iv, p. 296, pl. ix, fig. 5.

Light straw with olive markings, partly defined with black. Palpi white, the second joint shaded with olive on outer side. Fore wing with an olive streak below costa near base, an oblique streak from basal angle to middle of cell, tipped with black, longitudinal oval patches medially along lower edge of cell and fold, each edged above with black, an oblique patch extending down from costa at ⅗, in line with a longer bar extending to anal angle, edged above and especially on outer side with black, a larger fusiform patch extending across apex. Ground more or less suffused and dusted with fuscous, especially along inner margin. Hind wing translucent fuscous, with semi-erect scaling. 7–8 mm.

Male genitalia with uncus obsolescent; gnathos very long, with

truncate bifid apex, and valves slender, strap-shaped, concave upward. (pl. XLV, fig. 27).

Mexico and Jamaica (Walsingham). Porto Rico: Coamo Springs, Apr. 6–10, El Yunque, Apr. 23; Jájome Alto, June 18 (Hoffman).

Saphenista semistrigata new species (pl. XLII fig. 5)

Closely similar superficially to *S. multistrigata,* but in fact nearer to *S. lepidulana.* Fore wing with a defined olive streak running up from basal angle; median fascia divided into three olive patches corresponding to the spots of *S. multistrigata,* the two upper wholly olive, the lower rounded-triangular, with a few black scales representing the black edging of *S. multistrigata;* also a black dot at end of cell. Outer part of wing with more confused olive spots and a couple of black striae near middle of outer margin. 9 mm.

Male genitalia (pl. XLV, fig. 26) with uncus small, with a spherical swelling at base, suggesting a bird's head and beak, scaphium larger, bluntly pointed; valves broad, the costa abruptly bent at middle in an obtuse angle.

Porto Rico: El Yunque, Apr. 22 (type), Mar. 29 (paratype); also paratypes from Coamo Springs, Apr. 4–9. Types no. 1039 in Cornell University.

Saphenista new species. El Yunque, Apr. 23.

Phalonia subolivacea Walsingham (p. 95). Common and general. The Insular Experiment Station has the species bred from *Erechtites hieracifolia.* In old specimens the olive wholly disappears and the markings become a dull red-brown. Male genitalia characterized by a short forked gnathos (pl. XLV, fig. 28).

Coamo Springs, Apr. 4–10, Isabela Apr. 24, Cataño, Apr. 21. El Yunque, Mar. 29, Aguirre, Aug. 1 (Leonard), Apr. 2–3, 1931 (Leonard and Mills); Puerto Real, Vieques Id., Apr. 28–29.

P. distigmatana Walsingham (p. 96). Isabela, Apr. 24.

P. new species. El Yunque, Apr. 22.

COSSIDÆ

Psychonoctua personalis Grote (p. 97). Coamo Springs, Apr. 4, Cataño, Apr. 21, Aguirre, May 22 (Leonard), Jájome Alto, June (Hoffman), Lares, Sept., Dec. (Seín), Mayagüez, (U. S. Nat. Mus.); Puerto Real, Vieques Id., Apr. 28–29.

YPONOMEUTIDÆ

[Atteva gemmata Grote

1873. *Oeta gemmata* Grote, Bull. Buff. Soc. Nat. Hist. i, p. 93.
1877. *Oeta fastuosa* Zeller, Horae Soc. Ent. Ross. xiii, p. 25, pl. iii, fig. 68.

1892. *Oeta fastuosa* Walsingham, Proc. Zool. Soc. 1891, p. 533.
1897. *Atteva fastuosa* Walsingham, Proc. Zool. Soc. 1897, p. 113.
1914. *Atteva gemmata* Walsingham-Durrant, Biol. Cent.-Am. Lep. Het. iv, p. 328.
1914. *Atteva gemmata* Meyrick, Lep. Cat. xix, p. 21.

Orange, with over half the surface of the wing covered by areas of blue-black reticulation on a cream white ground, tending to reduce the orange ground to about 6 patches. Larger than the wide-spread *A. aurea* and *punctella* and with far less orange than *A. floridana* Neumoegen, which may be a variety.

Honduras, Cuba. Haiti: Petionville, May–June (Fulda).]

Yponomeuta triangularis Möschler (p. 99). St. Thomas: Charlotte Amalia, Aug. 11 (Leonard).

Plutella maculipennis Curtis (p. 100). Coamo Springs, Apr. 5–7, Isabela, Apr. 24.

GLYPHIPTERYGIDAE

Tortyra aurofasciana Snellen (p. 101). Puerto Real, Vieques Id., July 9 (Leonard).

HELIODINIDÆ

Heliodines quinqueguttata Walsingham (p. 104). Dorado, June 13 (Hoffman); Aguirre, Aug. 1 (Leonard), Apr. 2–3, 1931 (Leonard and Mills).

COSMOPTERYGIDÆ

Cosmopteryx attenuatella Walker (p. 107.) Coamo Springs, Apr. 4. There is a misprint in the bibliography of this species; for *Pyroderces rileyi,* read *Cosmopteryx attenuatella.* The reference is correct. Also read *lespedezae,* not *oe.*

Cosmopteryx antillia new species (pl. XLII fig. 6)

1930. *Cosmopteryx mimetis* Forbes, Sci. Surv. P. R. xii, p. 108. (not *Cosmopteryx mimetis* Meyrick).

Closely similar to *Cosmopteryx mimetis* except in the following points. Antenna with the most basal white ring obsolescent (*mimetis* has two distinct rings separated by one black segment). Fore wing with ground paler orange-yellow, the antemedial silver band only two instead of three scales wide, and less tapering, being of even width practically to costal edge, the black dot beyond it small and standing free of the fascia (in *mimetis* large and mostly embedded in the fascia) and the costal edge contrastingly white before the fascia; silver streak in apex continuous, though not quite meeting the central extension of the yellow median area (in *mimetis* divided into two dashes).

The species looks more like *bambusae* than *mimetis,* but the first fascia is more erect and the tip of the antenna is black. Specimens from Sta. Lucia in the Cornell University collection appear to be still another species, though very closely related.

Porto Rico: Coamo Springs, Apr. 10. Type and paratype Cornell Univ. no. 1040.

C. sanctivincenti Walsingham (p. 108). Coamo Springs, Apr. 9, El Yunque, Mar. 29, Apr. 22.

C. similis Walsingham (p. 108). Coamo Springs, Apr. 4, Puerto Real, Vieques Id., Apr. 29.

Pyroderces rileyi Walsingham (p. 108). Aguirre, Apr. 2–3, 1931 (Leonard and Mills); Puerto Real, Vieques Id., Apr. 29.

Prochola Meyrick

Antenna shorter than fore wing, scape long and slender, without pecten, the outer segments whorled; palpi upturned, the second segment a little rough below at end, third equally long, blade-like, the scales in regular transverse rows, and rough along upper edge; hind tibiae hairy above, with an oblique scale-ridge running down to outer spurs; the longer spurs with combs (as in some species of Aristotelia). Fore wing practically smooth, with cell central, R_4 and $_5$ only stalked, Cu_2 long, 1st A lost, 2d A forked at base; hind wing linear, narrower than in *Perimede,* all veins separate, but M_1 weak and close to R at origin.

A mostly South American genus, apparently close to Perimede. There is also an undescribed species from the Gulf Strip.

Prochola fuscula new species (pl. XLII fig. 7)

Antenna light fuscous, with the raised whorls darker, especially on the somewhat paler apex; second segment of palpus luteous, with a fuscous subterminal band; third fuscous, pale toward base, with the rough scaling mixed with blackish. Fore wing mottled light fuscous on clay color, tending to show striae especially on margins, and faintly iridescent; a black dot in fold and one at end of cell, some blackish scales on inner margin, emphasizing the striae, and on outer margin, corresponding to the veins, also faintly on costa toward apex; fringe concolorous. Hind wing silver gray, with a pale fuscous fringe. Hind tibia with raised scale-ridge luteous, followed by a contrasting blackish shade. 8 mm.

Porto Rico: Puerto Real, Vieques, Id., Apr. 29 (type), Coamo Springs, Apr. 4 (paratype): Cornell Univ. type no. 1041.

Perimede Chambers

Antenna moderately long, the scape long, slender, without pecten; palpus regularly upturned, a little flattened, the second segment thick,

but close-scaled, and third slender. Venation as in Prochola, M_1 of the hind wing normally developed. A small genus, mainly North American, related to *Prochola* and *Ithome*.

Perimede annulata Busck (?).

1914. *Perimede annulata* Busck, Proc. U. S. Nat. Mus. xlvii, p. 2.
1915. *Perimede annulata* Walsingham-Durrant, Biol. Cent.-Am. Lep. Het. iv, p. 406.

Deep bronzy brown-black with four raised scale-tufts on fore wing, an antemedial one in fold the largest. (Antenna with white tip). 11mm.

Cataño, May (Leonard and Mills). The single female has been compared with the type of *annulata*, but is too poor for certainty.

Perimede purpurescens new species (pl. XLII fig. 9)

Umber brown, the thorax and fore wing with a decided iridescence, in most lights violet blue, but changing to crimson; immaculate. Head and first segment of abdomen above paler and grayer; last ten segments of antenna white, contrasting; hind femora and under side of abdomen paler, the legs with obscure paler rings on segments. Under side of wings immaculate, without the dark terminal bars of *P. erransella* and *falcata*. 12 mm.

Porto Rico: Lares, 1930 (Seín); female type, Cornell type no. 1043.

Eriphia Chambers (*Ithome* Chambers, *Eritarbes* Walsingham)

I think there is no question as to the identity of these three names. Chamber's original description of *Eriphia* is hopeless, but fortunately some of the type material survives in the National Museum, and is identical with that of *Ithome unimaculella*, described also in the Can. Ent. two months later. In the description of the latter, Chambers mentions the pale scales on the under side of the third segment of the palpus, which seem to be found in the entire genus. The type locality is Texas, and not Kentucky as stated in Dyar's list, but the Chambers material includes a Kentucky specimen, and Tennessee specimens agree even in genitalia with those from the Gulf strip. I suspect all the species have the pecten with a single bristle, but it is deciduous, and in one or two species I have not seen specimens that had preserved it. There is a clay color under scaling, and rubbed specimens become entirely different in appearance. For venation see pl. XLIII, fig. 4.

The genitalic characters are unique, and in the female there is nothing to compare with them in the entire higher Tineoids. In the male (figs. 29–35) the dorsum is formed mainly of the eighth

abdominal segment, the ninth being reduced to a slender chitinous loop, which is solidly fused at its end to the eighth, and receives its whole strength from it. The uncus may survive as a tiny free point. The eighth segment is also strengthened by a median chitinous rod (shown most plainly in outline in fig. 30). Ventrally the ninth segment (saccus) is reduced to a longitudinal bar, with which the base of the penis articulates, and the 7th and 8th segments are indistinguishably fused, being supported by chitinous bars or a loop, which I suspect really belongs to the 8th segment. The other structures vary enormously from species to species, and are more or less (sometimes extremely) asymmetrical. In the female (fig. 36) the usual hairy lobes of the ovipositor are replaced by a triangular, heavily chitinized piercing blade, with serrate edges, and evidently adapted for laying the egg in the tissues of the food-plant. This structure closely parallels that of the Incurvariidae, to which Busck would relate the genus (in lit.); but I thing the resemblances in other structures to *Perimede* are too deep to be ignored; also I think I can see the vagina and bursa connected with the eighth segment; at least there are specialized chitinous structures at that point, as in other higher moths.

KEY TO SPECIES

1. Apical part of antenna whitish, contrasting ---------- 2
   Antennal shaft all the same color or nearly so ---------- 5
2. Expanse over 10 mm., fore wing with some chestnut scales at a base above and below fold ---------- *conspersa*
   Expanse under 10 mm. ---------- 3
3. No costo-apical pale spot, inner third of wing more or less contrastingly paler, yellowish, with a large strongly contrasting black spot (Central America) ---------- *otiosa*
   A contrasting whitish or luteous costo-apical spot, inner margin not yellowish, claviform spot smaller ---------- 4
4. Palpus usually with about 7 contrasting pale scales below, subapical pale spot contrasting in both sexes (U. S. A.) ---------- *concolorella (unimaculella)*
   Palpus with only a few inconspicuous pale spots, costo-apical spot of male obscure ---------- *curvipunctella*
5. Powdery gray, immaculate ---------- *piperatella*
   With distinct pale costo-apical spot or blackish discal spots or both ---------- 6
6. Male with shaft of antenna broadened and wholly light silver gray, conspicuous (in female normal and dark); ground glistening, nearly black with several contrasting pale yellow spots; very small ---------- *pernigrella*
   Male antenna normal, dark and slender; ground grayish, the darker discal spots distinct ---------- 7
7. Abdomen and legs whitish ochreous; antenna, head and thorax with a tawny tint ---------- *tripunctata*
   Legs blackish with white bars; antennae blackish, becoming pearl gray in some lights, but without tawny tint ---------- *quinquepunctata*

Eriphia pernigrella new species

Male with head, body and wings coal black, with a very faint purple iridescence. Palpi very slightly paler on inner side, with a few contrasting whitish scales on under side of third segment; antenna with scape black, the rest thick, and smooth scaled, gray and contrasting. Abdomen with last segment light gray, contrasting, with yellowish side-tufts. Fore wing with small pale costo-apical spot and dorsal spot opposite it, a crescentic or semicircular whitish dot in fold, with a black spot before it, visible only in some lights; discal dot also black, sometimes followed by a few pale scales, nearly invisible. Hind wing and under side of both wings covered with black sex-scaling, only the tuft of bristles on the costa being paler; fringe light gray, contrasting, with buffy iridescence in some lights. Female generally similar without the black sex-scaling; antenna slender, the shaft with black scaling above; abdomen light gray, paler below, hind wings and side gray; outer discal dot on fore wing mere distinct. Fore legs in male black, middle and hind legs with contrasting pale spurs and rings on ends of segments, in female with more extensive pale banding. 6–7 mm.

Male genitalia with eighth segment dorsally very large and hood-like, with a pair of chitinized lateroventral lobes, bearing the lateral scale-tufts at their bases; genitalia proper much reduced, with a large asymmetrical spine. (Pl. XLVI, fig. 29–33 male, fig. 36 female.)

Porto Rico: Puerto Real, Vieques Id., Apr. 28, 29, type and paratypes; Cornell Univ. no. 1044. I have a couple of damaged females apparently of this species from Castries, Sta. Lucia, Sept. 10–22, 1919 (Bradley).

Eriphia curvipunctella Walsingham. I am not sure of my identification, as the only authentic specimen in the U. S. National Museum has lost its abdomen, and Walsingham's description is unusually indefinite; also my few males are in poor condition.

Male genitalia (pl. XLVI), fig. 34) with dorsal lobe of eighth segment small, the lateral ones larger, valves slender, strong with heavy bristles on inner face; a strong crooked unpaired spine on left side, and hooked penis.

Santurce, Mar. 25 (Hoffman), Puerto Real, Vieques Id., Apr. 29; Coamo Springs and Isabela, Apr. (females only).

Eriphia quinquepunctata new species

Fuscous; the scales with contrasting whitish bases and with whitish underscaling, so that the moth becomes steadily paler as it gets rubbed and may become almost clay color. Palpus pale on upper and inner side, with a series of contrasting pale scales on under side of third joint; antenna blackish, with only the tip of the scape contrastingly pale; slender in both sexes. Abdomen much paler, the terminal tufts of male clay color, the dorsal one narrow, and the lateral ones narrow, straight and not very conspicuous. Legs fuscous, banded with clay color at tips of segments; middle and hind legs with a band across tibia also, and with the inner surfaces clay color. Fore wing more or less dusted

by the showing of the pale scale-bases; three black discal dots, each defined with a clay-color dot or bar at its outer end, the one in fold the largest; also pale costo-and dorso-apical spots opposite each other, without accompanying black spots. Fringe gray, hind wing pale clear gray, the fringe duller and with a faint golden ididescence in certain lights. 7 mm.

Male genitalia (pl. XLVI, fig. 35) with dorsal process of eighth segment narrow, not really hood-like; valves slender, each accompanied by a smaller slender process, of which the left member is double; unpaired spine in region of gnathos slender.

Porto Rico: Puerto Real, Vieques Id., Apr. 28–29, type and several paratypes, also a doubtful (rubbed) female from Coamo Springs, Apr. 9. Cornell Univ. type no. 1045.

E. conspersa Walsingham (?) M_1 short-stalked; unicolorous fuscous. 11mm. Lares, July 28 (Leonard). [St. Vincent].

Stilbosis Clemens

Fore wing massively scale-tufted, with two pairs of heavy tufts; antenna moderate; the long scape without pecten; palpi broad, sharp in front but without rough scaling, upturned, with third segment as long as second; hind tibia normal. Fore wing (pl. XLIII, fig. 3) with M_1 long-stalked and R_3 short-stalked, with $R_4 + _5$; Cu_2 free at base, easily mistaken for 1st A, which is absent; hind wing half as wide; R and M_1 stalked, M_2 and $_3$ connate, the other veins separate.

A small genus, best developed in tropical America. The following species appears to be unique in its solid dark ground.

Stilbosis phaeoptera new species (pl. XLII fig. 8)

Dark umber brown. Head and thorax blackish; second segment of palpus whitish within; antenna with terminal quarter whitish, contrasting; legs dark, with narrow white rings at ends of segments and across middle of tibiae, as usual. Fore wing with blackish tufts: a very large antemedial one across fold, nearly to inner margin, with a small one in the fold just beyond; two median tufts, the upper one twice as large as the lower; and a small tuft at lower angle of cell, besides slight marginal tufts around the apex. Wing practically immaculate, but with a somewhat angulate lead-gray subterminal line visible in some lights. 12 mm.

Porto Rico: Coamo Springs, Apr. 10 (type), El Yunque Apr. 23 (paratype). Cornell Univ. type no. 1042. I have also a specimen from Zanderij I, Boven Para River, Surinam, Apr. 21, 1927, which I cannot distinguish from this species.

Aphanosara new genus

Antenna about ¾ fore wing; scape slender, without pecten; shaft whorled with raised scales outwardly, densely but shortly ciliate between whorls below;

palpi moderate, slender; second segment with a small Mompha-like tuft at tip, third a little shorter, slender and pointed; eyes red; no ocellus; fore tibia stout, with hair-scales extending beyond its tip, hind tibia with bristly hair of even length. Fore wing (pl. XLIII, fig. 5) lanceolate, with tip turned up like many Lyonetiidae; R_4 *free*, from tip of cell, M_1 long-stalked with R_5, M_2 and M_3 connate, Cu_1 separate, Cu_2 well back, 1st A apparently lost; hind wing less than ½, costa hardly sinuate, fringe 3; R and M_1 connate, the rest of the veins separate.

A very striking thing; it is the nearest thing that I know outside of Hawaii to the typical Diplosara group, but is distinguished from all "Diplosaridæ" and all other Cosmopterygidæ of which I have seen any account, by the free R_4 and stalked M_1. The male genitalia are also of Diplosarid type (pl. XLVI, fig. 37), with uncus absent; gnathos paired, the right lobe enormously larger than the left, spirally twisted, and easily mistaken for the uncus; the rest of the genitalia symmetrical, with extra processes arising from the articulation of the valves. The following species is the genotype, and the only Diplosarid in the restricted sense know to me outside of Hawaii.

Aphanosara planistes, new species (pl. XLII fig. 10)

White. Antenna with scape white, basal part of shaft regularly barred with fuscous, apical part with three pairs of black bars, in each case with the first segment bearing a basal and second an apical bar; segments 1–3, 6–7, 10–11, and 14–16 from apex white, 4–5, 8–9, and 12–13 from apex bearing the pairs of black bars. Palpus with black bars near apex of second and third segments, first segment also dark; thorax with yellow longitudinal stripes over junction of disc and tegulae; legs mostly white, front of fore tibia and knee fuscous, with a white line across tibia, fore tarsus with two blackish bars; mid tibia and tarsus with subapical blackish bars.

Fore wing white, with a dull yellow antemedial patch over and below fold, narrowly connected along fold to base, an oblique stripe from costa at ¼ to opposite middle of inner margin, where it is abruptly cut off, and edged by an oblique black bar at its outer angle below the fold; an oblique black striae at middle of costa, a postmedial shade from costa across the wing to lower part of outer margin, diffuse below, where it is bordered by a patch of blackish scales, and defined with a black bar on costa beyond; apex of wing also yellowish, leaving a white post-medial costal triangle. Hind wing nearly white; fringes pale yellowish. 9 mm.

Porto Rico: El Yunque, Mar. 29; type and paratype, Cornell Univ., type no. 1046.

BLASTOBASIDÆ

The U. S. National Museum has specimens of this family with the following biological records, which may serve as a hint in the search for further life-history data. *Valentinia bromeliæ* in plant

rubbish in Bromeliads (Knab); *Auximobasis coffeella* Busck on coffee (Neiva); *Blastobasis lecaniella* on the scales *Lecanium, Ceroplastes* and *Saissetia; Holcocera* sp. boring in grapes on St. Thomas (VanZwaluwenberg):

About 100 specimens were collected of this very difficult family, unfortunately mostly females. The following have been determined with some approach to certainty.

Blastobasis subolivacea Walsingham (p. 112). I have determined as this species a form with the fore tarsus as well as tibia fuscous, pale banded; they are from Coamo Springs, Apr. 6, 10; more doubtful are a pair from Puerto Real, Vieques Id., specimens from Charlotte Amalia, St. Thomas (Leonard), and a very dark specimen from Aguirre.

B. argillacea Walsingham (p. 112). More mottled than the last, with red-brown shading and contrasting fuscous scaling, the ground frequently pale around the first discal dot, and below in a zigzag shade, which defines the dark zigzag mark. Puerto Real, Vieques Id., Apr. 28–29; Coamo Springs, Apr. 5–10, Santurce, Mar. 29 (Hoffman) (female only). St. Thomas; Charlotte Amalia, Aug. 11 (Leonard).

B. new species (?). Light wood brown; fore tarsus wholly pale, contrasting with tibia, etc. San Germán, Apr. 16.

Auximobasis variolata Walsingham (p. 113). Coamo Springs, Apr. 9 (compared with a specimen determined by Walsingham in the National Museum); Puerto Real, Vieques Id., Apr. 28–29.

A. insularis Walsingham (p. 113). This form appears to intergrade with the preceding. Puerto Real, Vieques Id., Apr. 28–29.

A. flaviciliata Walsingham (p. 113). All my female material is *flaviciliata*, male *constans*, but Walsingham claims to have males of both. Puerto Real, Vieques Id., Apr. 28–29. St. Thomas, Mar. 24, 1927.

A. constans Walsingham (p. 113). Puerto Real, Vieques Id., Apr. 28–29.

Auximobasis sp. There are odd specimens of several more species of this genus.

Pigritia sp. (p. 111). A pair which I cannot distinguish offhand from the North American *P. ochrocomella*. Palmas Abajas, 1100 ft., June 23 (male, Hoffman); Coamo Springs, Apr. 10 (female); Lares, July (Leonard).

Gelechiidæ

A number of very interesting forms of this family were taken, and the fauna is evidently far from exhausted. The new genus

superficially resembling *Glauce* is particularly interesting, as the genitalia show it to be related to *Eucleodora,* now standing as an *Œcophorid,* and *Blastodacna,* now considered a Lavernid, though its wing characters would cause it to be put in the Gelechiidæ without any hesitation. In fact on superficial examination I had supposed it was a slightly aberrant Glauce, and Busck had been quite willing to call it an Aristotelia.

Tholerostola Meyrick

Tongue present in Porto Rico species (described as obsolete); palpus with second segment thickened with rough scales, third equally long. Fore wing (pl. XLIII, fig. 6) with R_1 weak but traceable, R_4 and R_5 stalked as usual, M_1 free; M_2 and $_3$ stalked, Cu_2 in our species well back from angle, arising before R_2; cell slender, obliquely closed; hind wing with a large hair-pencil in male, covering Sc, notched below apex; M_1 lost, M_2 nearly connate with M_3 near base, Cu_1 somewhat separate; cell open.

The genotype differs specifically in having banded palpi and the fore wing obliquely banded on a gray ground, but also shows the costal pencil. It may be generically distinct from the Porto Rico species, which is tentatively placed here.

Tholerostola evippella new species (pl. XLII fig. 11)

Fuscous and cream white. Head white, with a little fuscous behind base of antennae; palpi with basal half fuscous on outer side; fore and middle legs fuscous in front, barred with whitish, inner faces and hind legs almost all whitish; antennae with scape powdery fuscous, the shaft clay color with the short whorl of scales on each segment largely fuscous. Thorax above whitish in center, fuscous on sides; abdomen dirty clay color. Fore wing shining fuscous brown, with faint iridescence; the dorsal third contrasting cream white; dark area becoming blackish on lower boundary, extending slightly below fold on basal third, and in a very obtuse triangle at middle of wing, on outer third more diffuse, and ending vaguely at anal angle; a few gray scales near inner margin beyond middle, and a small diffuse cream costo-apical spot. Fringe cream opposite costal spot, then powdery fuscous to middle of outer margin, then cream white for a short distance continuing the cream dorsal area, and somewhat grayer, but still very pale below; hind wing pale gray. 7 mm.

Porto Rico: Isabela, Apr. 24 (type); San Germán, Aug. 20 (Leonard) and Coamo Springs, Apr. 5, 7 (paratypes). Cornell Univ. type no. 1047. The U. S. National Museum also has the species from Cuba.

Aristotelia Hübner

The following key will serve to separate the Porto Rico species of Aristotelia at hand, including one not described in this paper.

1. Fore wing conspicuously marked, or dusted with rose ---------- 2
   Fore wing with ground unicolorous, markings slight or faint ---------- 5
2. Conspicuously marked with lead color; fore wing of male below with conspicuous cream sex-scales, enclosed in black ones ---------- *penicillata*
   No lead-colored markings ---------- 3
3. Basal part of shaft of antenna and third segment of palpus *longitudinally* striped with black and white; palpus with third segment very long; antenna with tip not banded (group *roseosuffusella*) ---------- *new species*
   Third segment of palpus and base of antenna transversely banded, antenna white-banded to near tip; third segment of palpus usually little longer than second (group *pudibundella*) ---------- 4
4. Antenna with *alternate* segments toward apex barred; male with costal edge of fore wing plaited, a groove in disc, etc. ---------- *diolcella*
   Antenna with terminal segments all alike, annulate; no striking sex-characters in male ---------- *vagabundella*
5. Antenna with a few segments toward apex with whitish rings, fore wing with black discal dot; palpus nearly plain ---------- *absconditella*
   Antenna without 2 or 3 white-ringed terminal segments; palpus banded, no distinct black discal dot ---------- 6
6. Antenna contrastingly annulate with black and white; fore wing fuscous ---------- *pictiornis*
   Antenna with dark and pale bands of two segments each; wing ochre ---------- *lignicolora*
   Antenna fuscous, not conspicuously marked; fore wing gray, fuscous and tawny ---------- *lycopersicella*

Arstotelia vagabundella new species (pl. XLII fig. 12)

1897. *Aristotelia pudibundella* Walsingham, Proc. Zool. Soc., 1897, p. 66.

1930. *Aristotelia pudibundella* Forbes, Sci. Surv. P. R. xii, p. 116.

(not *Gelechia pudibundella* Zeller)

Head and thorax fuscous, shading to a light wood color or even clay color on the face, somewhat dusted with darker, and with a slight golden iridescence which tends to form three longitudinal stripes on the thorax, but no reddish iridescence. Antenna with scape and pedicel powdery fuscous, shaft blackish, with a white dot of one or two scales on each segment, nearly to the tip, and with a more continuous pale line on the lower posterior side, which also breaks into faint pale dots toward apex. Palpus blackish, with three white rings on second segment, the last one terminal, and three on third segment, leaving the base and tip blackish; the rings broader on the upper inner side, where the first two normally fuse. Fore femur and tibia blackish with slight transverse bars, the tarsus with clay colored bars near base and at tip of first segment, and at

tip of second, but third as well as fourth entirely dark. Middle and hind legs with the usual more extensive light markings. Abdomen concolorous fuscous, paler and banded below, with the terminal tuft contrastingly pale, but more or less completely withdrawn into the next to last segment.

Fore wing above with ground fuscous gray, somewhat powdery and mottled, becoming nearly black near costa; before the first and after the second and third fasciae inner margin below fold heavily shaded with dull ochre or wood brown, with a faint brassy iridescence, mostly leaving the extreme margin gray; the ochre extending up to below end of cell, where it makes a spot, and more narrowly along the very oblique outer margin nearly to apex. Fasciae essentially as in *A. roseoffiusella*, black-brown, and not contrasting with the darker portions of the ground, the first fascia rather narrow, diffuse basally, the first and second ending in black bars along the fold; second fascia not extending up and out into the disc, but followed by a smallish black first discal dot; third fascia subtriangular, obscure, ending below in the bar-like outer discal dot, which bounds the ochre outer spot above; center of apical part of wing shaded with blackish, the outer part of costa and apex surrounded with a series of alternate whitish and black bars. Fringe luteous subapically opposite R_2 and R_3, where it continues a relatively pale portion of the ground, then mouse gray to apex, where it is continued by a dark basal shade to near middle of outer margin, outer part of dorsal fringe and whole fringe toward anal angle pale fuscous, with some dark tips at apex. Hind wing gray, with nearly concolorous fuscous fringes; under side fuscous, with the pale subapical spot of the fore wing obscurely repeated. No obvious sexual modifications, the costa of the hind wing with a few stiffer hair-scales to represent the hair pencil of *A. diolcella*. Sexes similar. There is some variation, especially in the amount of fuscous dusting and of yellow. 9 mm.

Male genitalia with uncus short (pl. XLVII, figs. 40, 41) and stout; subscaphium weak, tegumen with a concave surface near exit of aedoeagus, clothed with a brush of short stiff bristles; valve slender, nearly cylindrical, basally apparently fused with the fused saccus and juxta, which terminates in a pair of triangular chitinizations; nearly simple toward apex; aedoeagus stout, blunt, unmodified. Intersegmental membrane with a fringe of pale short hair-scales, and a large fanlike tuft on each side.

Porto Rico: Puerto Real, Vieques Id., Apr. 28–29 (type and many paratypes); Isabela Apr. 24 and Coamo Springs, Apr. 4–10, Aguirre, Apr. 2–3, 31 (Leonard and Mills) (paratypes). Cornell Univ. type no. 1048. The species has not yet been seen outside of Porto Rico.

Aristotelia diolcella new species (pl. XLII fig. 13)

1897. *Eucatoptus rubidella* Walsingham, Proc. Zool. Soc. 1897, p. 70.
1930. *Aristotelia rubidella* Forbes, Sci. Surv. P. R. xii, p. 117.

(not *Gelechia rubidella* Clemens)

Head and thorax mottled or powdery fuscous, the head paler, and sides of thorax blackish with a row of pink splashes; tegulae blackish; antennae on basal part fuscous, somewhat annulate, each alternate whorl of scales marked

PLATE XL.

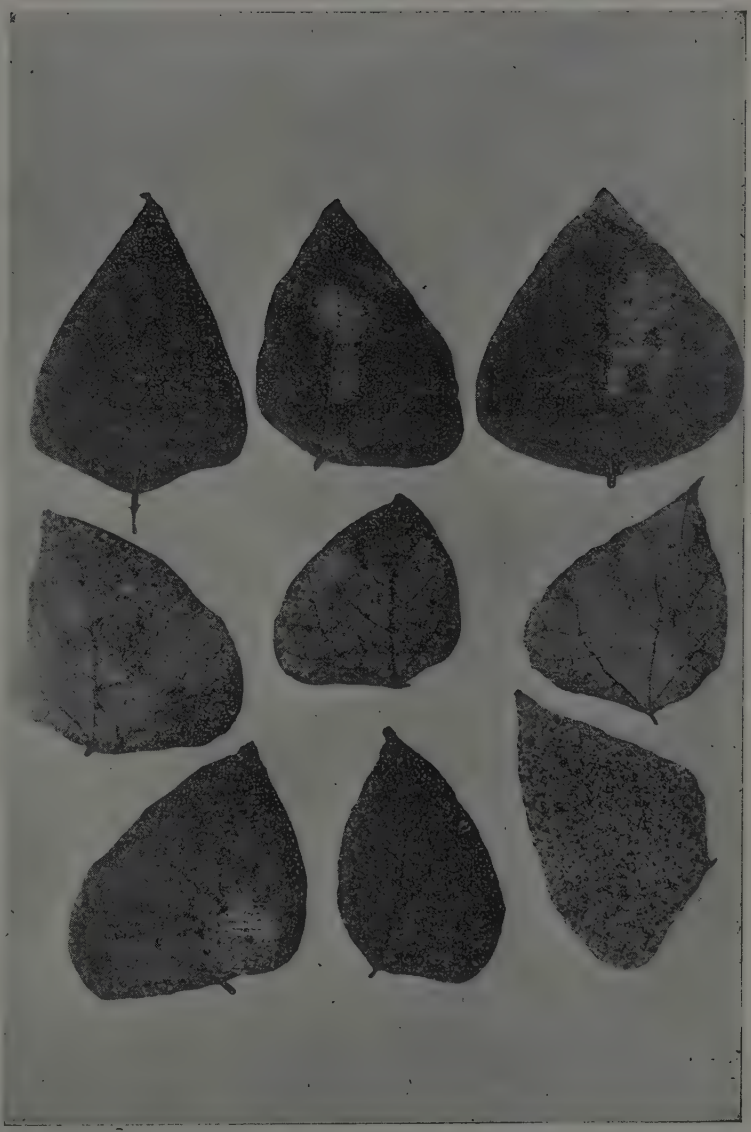
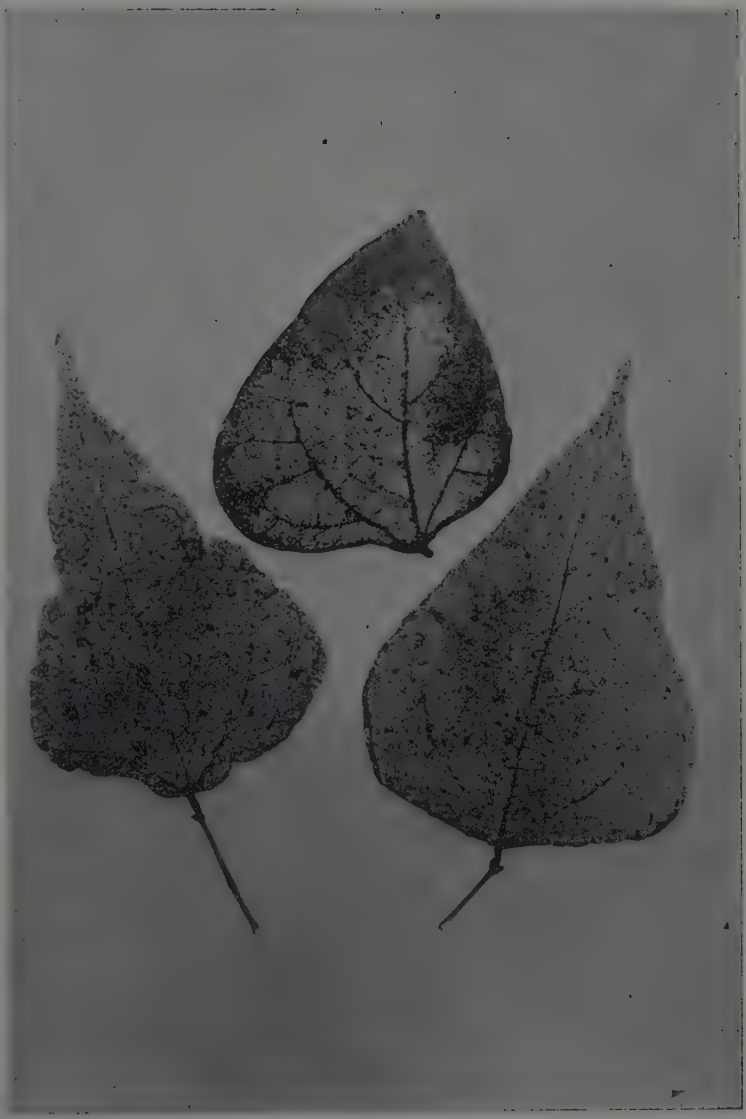


PLATE XLI.



THE HAITIAN COFFEE TREE CRICKET

By Charles H. Arndt, formerly Director of the Coffee Station, and Herbert L. Dozier,* Entomologist, Service Technique, Port-au-Prince, Haiti

Haiti is very fortunate in that many serious coffee diseases and insect pests are not found in that country. This is somewhat offset, however, by the damage caused by a native tree cricket, recently described as *Chremon repentinus* Rehn.[1] This species in its sum total of features is probably nearest *Stenogryllus* Saussure, a genus also known only from Santo Domingo. It is related to some African forms and it was at first thought that the species might possibly have come to Haiti in early slave ships.

DISTRIBUTION

This cricket was not recognized as a serious pest until recent years when the damage it caused to young coffee plantations was observed. It is assumed that this insect is confined to the island of Hispaniola as it has not been reported to date from any other country where coffee insects have been seriously studied. It is widely distributed in Haiti and its work has been observed in the Massif de la Hotte, Rochelois Plateau, Massif de la Selle and the Massif du Nord, from sea level to an altitude of 4,000 feet.

ECONOMIC IMPORTANCE AND HOST PLANTS

It may possibly be a misnomer to call this insect "The coffee tree cricket" because it is indigenous to the island while coffee is an introduced plant. It has found coffee a very suitable plant for egg deposition and probably causes more damage to it than to any other plants of economic importance, thereby justifying the popular name assigned to it.

In the Fond-des-Negres valley this cricket lays numerous eggs in the stems of cotton but the damage does not seem to be serious on this host except in some instances where the stem becomes infected by parasitic fungi through the egg punctures. Other plants in which eggs are laid but on which the damage is of relatively little economic importance are Spanish cedar, *Cedrella odorata;* "Bois chene", *Catalpa longissima* (frequent); "Bois d'Orme", *Guazuma ulmifolia* (occasional); "Bois crapaud", *Psychotria*

[1] A New Genus of Eneopterinae from Hispaniola, Trans. Amer. Ent. Soc., 50: 87–92, 1930.

* Co-authors.

Brownei (frequent); castor oil, *Ricinus communis* (rare); mahogany, *Swietenia mahogani* (frequent); *Piper* spp. (occasional); *Russelia equisetiformis* (frequent); petioles of "Pistache des Indes", *Stercula apetela;* sour orange, avocado, saman, and cacao (rare). The terms in brackets indicate the relative frequency with which the egg punctures are found on the various plants as observed at the Fond-des-Negres coffee station. Native plants in which an abun-

FIG. 1.—Wilting and Death of the Top of a Young Coffee Tree Following Egg Punctures by the Coffee Tree Cricket, and Subsequent Infection of the Stem by the *Fusarium* Fungus; Note Accessory Up-right Shoots Which Developed After the Injury.

dance of eggs can usually be found are "liane barrique", *Trichostigma octandra,* and two species of *Hamelia,* one of which is the common "bois corail" of the gardens, *Hamelia erecta.* Eggs have also been found in the stems of two native weeds, one belonging to the Menthaceae, the other to the Compositae. All plants of the latter two groups listed are mostly weeds which grow along water courses. Emphasis should therefore be placed on keeping all areas around the plantation free of these weeds.

NATURE OF INJURY

These crickets are very inconspicuous, hiding during the day beneath rubbish, old leaves, etc., and feeding at night. During the egg-laying period the females may be readily found at night by

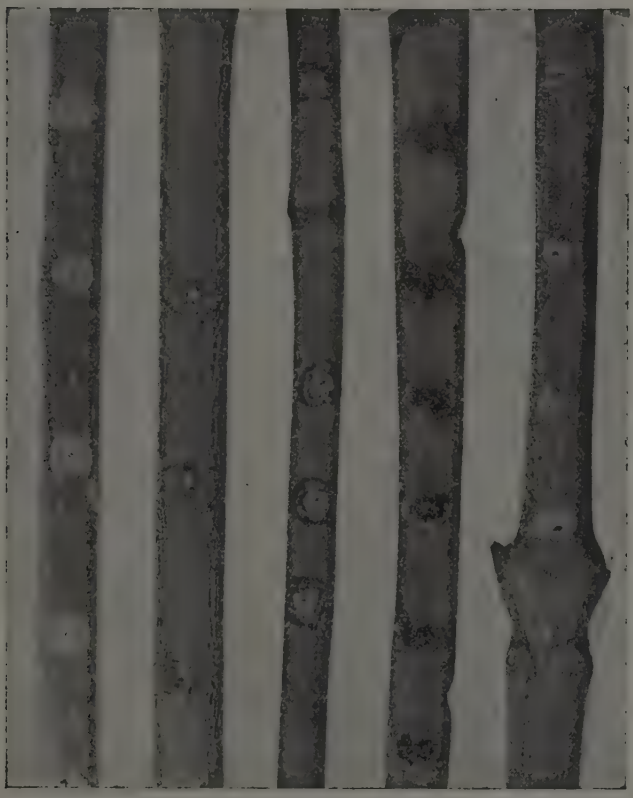


FIG. 2.—Stems of "Liane Barrique", *Trichostigma octandra*, Cotton and Coffee Showing Egg Punctures of *Chremon repentinus* Rehn, Natural Size.

searching among the coffee trees with a flash-light. They are then easily captured while in the act of oviposition. The males are very rarely found and are much less abundant than the females.

One's attention is usually first attracted to the injury by this

insect by what appear to be holes in the recent growth of the upright stems. These "holes" are made by the removal of the bark from the wood over a somewhat rounded area of about 5 mm. in diameter (Fig. 2). In the center of this area will be seen a small hole which extends into the pith. This hole is made mostly by the ovipositor for the insertion of the eggs into the pith of the stem. From three to six yellowish eggs are laid lengthwise in the pith above and below the hole. Stems from 5–9 mm. in diameter which

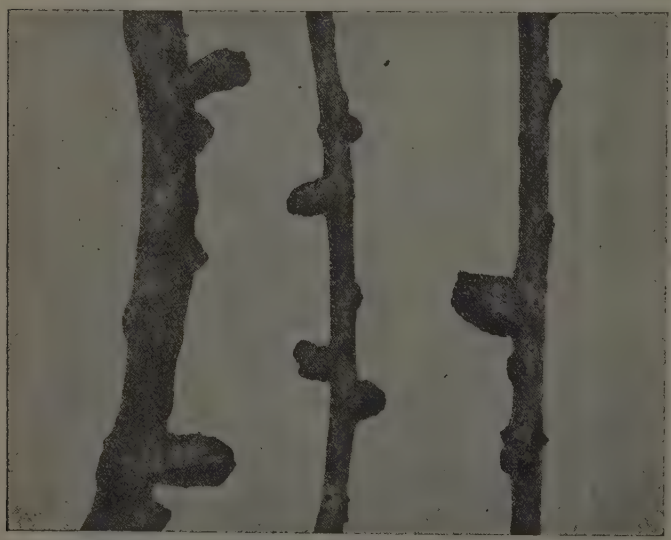


FIG. 3.—Hypertrophy of Stem of Haitian Oak, *Catalpa longissima*, a Condition Which Frequently Occurs After Oviposition Punctures by *Chremon repentinus*, Reduced.

are still green, with the wood soft, and having a large amount of pith seem to be preferred. Holes are rarely made in stems in which the wood has become well hardened. For this reason few punctures are made on the laterals because their wood becomes hardened before they are of a sufficient diameter to interest the crickets for oviposition.

The removal of the bark by the cricket over a larger area than is necessary for the insertion of the ovipositor for egg-laying, seems

to be a habit adaptation to prevent the plant from closing the hole rapidly by a callus formation and thus smothering the developing eggs. The holes are, nevertheless, frequently closed by a callus when they are made on rapidly enlarging stems. This frequently occurs on the Haitian oak where very noticeable hypertrophies as large as 1×1.5 cm. may be formed (Fig. 3).

The egg punctures themselves would injure the coffee plants little if it were not for secondary effects. The first of these is the tendency of the punctures to weaken the stems mechanically so that they are likely to break later when the laterals above the punctures set a heavy crop of berries. This weakening effect would be much less and of relatively little importance if it were not for the frequent infection of the xylem through these holes by parasitic fungi. A species of Fusarium * (Fig. 4) is the organism most commonly attacking the wood through these punctures, causing a discoloration of the vascular cylinder, but occasionally *Cercospora coffeicola* is the infecting fungus.

The *Fusarium* first attacks the pith and then grows into the wood and bark. White masses of fruiting mycelium appear on the surface of the stem adjacent to the infected puncture. The bark and pith become dark in color and the cricket eggs are frequently destroyed. It is only rarely that an old cricket hole is found which is not infected by some fungus. Frequently the infection does not occur until after the eggs have hatched, or if infection has occurred earlier the growth of the mycelium will not be sufficient to destroy the eggs. When young stems are infected, the stem above the point of attack is frequently killed. The leaves of the top will suddenly wilt, then become brown, and later brownish-black before falling. In certain plots at the Coffee Station at Fond-des-Negres as many as 60 per cent of the tops of the coffee trees were killed by such infections which followed cricket punctures. The egg punctures are usually from 2 to 3 cm. apart although occasionally they may be placed closer and at times the punctures may be opposite each other. As many as fifty-two punctures have been counted on a 60 cm. length of a coffee stem. The largest number of punctures observed for a single stem was 218 in a 340 cm. portion of a *Trichostigma octandra* stem.

* Provisionally determined by Dr. C. D. Sherbakoff, as very similar to if not identical with *Fusarium martii* A. & W.

The most serious effect of the cricket injury to the stem lies in the effect of any injury to the upper portion of the coffee tree upon its configuration or shape. Such injuries to the upright stem remove

FIG. 4.—Coffee Stems Showing Various Degrees of Infection by *Fusarium* Disease, Following Egg Punctures, Natural Size.

the inhibition of the terminal bud on the normally dormant secondary buds. The removal of this inhibition results in the development of an entanglement of uprights and laterals which is very

difficult to control. When the trees are regularly damaged each year by injuries of this nature it is impossible to follow any particular system of pruning. The pruning will be difficult and will have to be directed toward the utilization of the less-injured and the uninjured shoots for the development of the fruiting branches. There is no question of the seriousness of the damage which may be caused by this cricket and unless some means is discovered to reduce its injury below that which has been observed at the Coffee Experiment Station, it will remain a serious handicap to commercial coffee growing on the Island. The older and less rapidly growing trees are less seriously injured because of the relatively lesser amount of stem in which eggs may be laid. Several observations indicate that this cricket causes more damage to coffee in sunny places than to plants located under shady conditions.

SEASONAL HISTORY

Egg-laying occurs most commonly after the rapid growth of the shoots begins in the spring, although it may occur at any time of the year when suitable young shoots are present. Eggs hatch from five to twelve months after deposition. All eggs of the same puncture hatch at about the same time, although eggs laid in the same stem but at different punctures may hatch at different times. Eggs which are laid in April, May, and June, will usually begin to hatch the following December. Most of them, however, will not hatch until several months later. The adults and nymphs are difficult to find but the very young ant-like nymphs may be found at almost any time of the year by searching carefully among the dense coffee foliage. They are most abundant from March to June.

The nymphs and adults seem to feed mostly at night and their food apparently consists mainly of scale insects, plant lice and other small insects. In our rearing cages they were constantly supplied with fresh *Saisettia hemispherica* and *Coccus viridis,* two scales commonly present on coffee foliage and stems. They appear to be distinctly cannibalistic when confined with each other in close quarters. One batch of nymphs hatched May 10th yielded a single male survivor which reached maturity August 10th, 1930. Other partial rearing records coupled with field observations show that the time from hatching to adult requires from eighty to ninety days.

DESCRIPTION OF STAGES

Egg (Fig. 5.)—Whitish in color, semi-translucent, elongate cylindrical. Without a distinct cap area differentiated, as is commonly found with many species of tree crickets. The head of the developing embryo is always oriented toward the opening. Average length 3.25 mm.; greatest width .788 mm.

FIG. 5.—Diagramatic longitudinal section of stem to show manner of oviposition.

Nymph.—First instar: Color reddish-brown, the abdomen darker; hind femora banded with white; basal third of antennae pale, remainder dark; cerci pale. Resembles a small ant. Length 4.5–5.2 mm.

Second instar: General color brownish-black, the base of abdomen and sides of thorax marked with yellowish-orange; a very narrow cross-band on abdomen pale; antennae black except pale base; cerci black. Length 5.2–8.3 mm.

Third instar: General color brownish-black, the thorax for the most part tawny, abdomen with narrow pale cross band; legs black except longitudinal pale markings and distinctly paler base of femora; antennae black, pale at base; cerci blackish at tips, lightening towards base. Length 8.3–11.4 mm.

Fourth instar: Color much lighter than in preceding stage; head except front part, thorax and legs, pale yellowish-testaceous, the thorax outlined with black borders, and the hind femora with several longitudinal black markings; antennae black, banded with yellow at base and about the middle; cerci pale, black at tip. Length 11.4–15.5 mm.

Fifth instar: Distinctly paler, the head pale except the eyes and front part, dark; thorax outlined with narrow black border; abdomen for the most part dark, central median portion of each segment pale; wing pads pale, the venation and outer sides somewhat darker; legs pale, with lineate longitudinal dark streaking on femora. Antennae yellow except a very narrow black band a short distance from the base; cerci pale; ovipositor pale. Length 15.5–22. mm.

Adult (Fig. 6)—General color of head, pronotum and legs pale ochraceous-orange; abdomen brown with pale ochraceous-orange evident on dorsal surface; fore part of head and eyes fuscous-

brown; antennae pale yellowish-orange; pronotum with the entire border margined with brownish-black; tegmina or wing covers a pale clay color, the veins dull yellow. Legs pale, ventral margins of the femora and dorsal surface of the middle and hind femora lineate with fuscous-brown. Ovipositor brownish-black. The sexes may be at once distinguished by the difference in shape and vena-

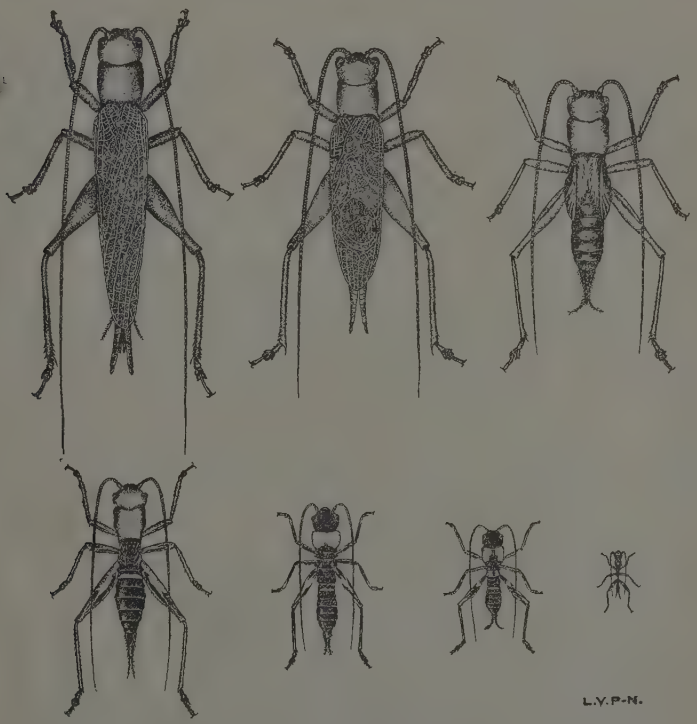


FIG. 6.—Adult Female and Male and Stages of Development of the Coffee Tree Cricket, Enlarged One-third.

tion of the tegmina. In the female the tegmina are very elongate, distinctly longer and more slender than with the male, the apices surpassing the tips of the tegmina. In the male the tegmina are broader with very different venation and with a sub-ovate tympanum. Length of male, 18.9–22. mm.; length of female, including ovipositor, 26 mm.

NATURAL ENEMIES

A very small ant has been observed to enter through the punctures, enlarge the holes, burrow though the pith from puncture to puncture, destroying the cricket eggs.

The *Fusarium* disease often infects and destroys the eggs through its mycelium.

In actively growing stems the holes are often closed by calluses and the eggs smothered.

The most important natural enemy of the coffee tree cricket, however, is a very small, elongated scelionid wasp which has only recently been described. As this original description was published in French a full translation of same is given here to enable recognition:

Leptoteleia arndti Dozier

Bul. No. 26, "Le Criquet Haïtien du Caféier", Service Technique, Port-au-Prince, Haiti, page 15.

This species is placed in Kieffer's genus *Leptoteleia* of which *Baryconus oecanthi* Ashmead is the genotype and is undoubtedly congeneric with the type species which is parasitic in the eggs of the snowy tree cricket, *Oecanthus nivcus*, of the United States. *Leptoteleia oecanthi* differs from this new species in having a shorter ovipositor, black legs, a black scape and entirely black head, thorax, and abdomen.

General form and abdomen extremely elongate. Head and antennae black except the scape which is yellowish; thorax yellowish-orange except the meso and metathorax which is darker on dorsum; first abdominal segment dark but the others are yellow, each segment divided by orange annulation; legs orange-yellow except distal knees and tarsi of the middle pair, the tarsi of the hind pair with exception of the proximal third of first segment, and the distal third of tibiae of second and third pair of legs, which are fuscous.

Length, excluding ovipositor, 3.05 mm.; length of ovipositor, moderately exserted, .47 mm.; greatest width across humerals .458 mm.

Described from a large series that issued March 23–24, 1930 from eggs of *Chremon repentinus* Rehn, collected at Fond-des-Negres, Haiti, on February 19th. These eggs were laid during the previous summer (April–June) and no parasites issued from fresh eggs deposited during the two months previous, suggesting only a single generation each year.

Type female mounted in balsam on slide, deposited (U.S.N.M. type number 43,328) together with series of point-mounted and alcoholic specimens in the U. S. National Museum.

These scelionid parasites have been observed to hatch from February to June. The head of the developing cricket host is always oriented toward the opening while that of the egg parasite is always away from the opening.

CONTROL MEASURES

When a large continuous area is planted to coffee and this area can be kept free of other host plants which might serve as egg depositories, it may be possible to greatly reduce the injury and prevent further increase of the crickets by removing all of the stems in which eggs have been laid between the time of egg-lying and hatching. In many sections this would necessitate pruning before the completion of the coffee harvest and earlier than would be otherwise desirable. It would also involve a considerable sacrifice of the coffee crop of the succeeding year as many of the infested shoots will have produced laterals on which floral buds are maturing. The loss from this source, however, might be much less than that which would be produced if the crickets were allowed to multiply unhindered.

These prunings should not be burned immediately but should be collected and placed in a specially screened room so that the issuing egg parasites would be allowed to escape and carry on their benefical work.

It is hoped that some suitable, cheap, and safe material will be found that can be used to kill or smother the eggs in the stems. Substances that may injure or burn delicate plant tissues must be avoided. Experiments are planned using a pine tar oil product that has great penetrating properties and yet is non-injurious to the plant. This can be easily applied with a few strokes of a paint brush in the hands of unskilled laborers.

o–O–o

with a whitish scale above; last ten segments with a stronger white bar on each alternate *segment,* then two black segments intervening beyond the enlarged white bar which ends the basal series. Palpus blackish, the second segment with three whitish bars, the third with three rings, both more or less pink in fresh material; terminal ring subapical on outer side but apical on inner side of palpus. Fore tibia with pink bars, tarsus with white rings on base of first segment and tips of all except fourth. Abdomen fuscous above, transversely barred with clay and fuscous below, somewhat paler than in *vagabundella;* male genitalia sometimes everted, then showing plainly the scoop-shaped uncus and narrow spatulate valves.

Fore wing dark fuscous, powdery, with numerous scattered bright pink scales, but obscure markings; first fascia nearly obsolete, second black-brown, obscure, cut off abruptly in male by the clay-yellow upper slope of the ridge which on the upper side represents the pocket for the hair-pencil; third fascia obsolescent, represented by some browner shading, extending down to the black second discal spot; 1st discal spot also black and inconspicuous; some yellowish scales at basal angle, defining the lower sides of the two discal spots, and subapically. Fringe blackish, barred with pink on the costa, the series of bars continued in the base of the dorsal fringe, outer part of dorsal fringe fuscous.

Male beneath with the costal edge plaited from base to ⅔, the plait clothed with dense rough clay-yellow sex-scales, general surface fuscous, paler toward base, the fringe barred with fuscous and clay color. Hind wing fuscous, normal, the costa with a large expansible hair-pencil, normally contained in a groove below the cell of the fore wing, which involves the material from the fold to the anal vein. Female similar, without the secondary sexual characters, the second fascia of the fore wing above generally less obscure, and crossing the fold. 8 mm.

Male genitalia with a scoop-shaped uncus, truncate at the tips, the valve spatulate with an angle on its lower edge at half length, and abruptly bent up; gnathos long and spine-like; penis simple, pointed. (Pl. XLVII fig. 42.)

Porto Rico: Puerto Real, Vieques Id., Apr. 28–29 (type and numerous paratypes); Coamo Springs, Apr. 9; San Germán, Apr. 16–17; Palmas Abajo, June 23 (Hoffman) (paratypes). Cornell type no. 1049. Also specimens from Trinidad in the U. S. National Museum (Busck), show the same essential characters but are a little more contrastingly marked.

Aristotelia absconditella Walker

1864. *Gelechia absconditella* Walker, List Lep. Ins. B. M. xxix, p. 595.
1903. *Aristotelia absconditella* Busck, Proc. U. S. Nat. Mus. xxv, p. 801.
1924. *Aristotelia absconditella* Forbes, Cornell Mem. lxviii, p. 296.
1925. *Aristotelia absconditella* Meyrick, Gen. Ins. clxxxiv, p. 45.
1872. *Gelechia palpiannulella* Chambers, Can. Ent. iv, p. 68.

Fuscous; antenna with a few scattered segments toward apex whitish, contrasting (usually the 5th and 10th from apex, but occasionally with some additional ones); palpus with tip of second

segment and some shading on third pale, unlike *lycopersicella*, which has a banded palpus. Fore wing with a faint pale oblique subapical costal dash and a black dot at lower angle of cell only; a broken dark line in fringe around apex. 8 mm.

Male genitalia (pl. XLVII, fig. 44) from a Connecticut specimen. Larva in stem of Polygonum, often forming a slight gall.

U. S., west to Kansas. P. R.: Coamo Springs Apr. 4, 10 (both female).

Aristotelia lignicolora new species (pl. XLII fig. 14)

Hind wing with M_2 curved and approximate to M_3 at base as in *Glauce* (and Gelechia etc.). Hind tibia with a fringe of long spines on each of the longer spurs, regularly decreasing in length and not reaching the end of the spur, better developed on upper spur; longer midtibial spur with a weaker fringe. (This comb is shared by *pyrodercia, picticornis,* and *Glaucacna iridea,* described below; but is absent in more normal species of Aristotelia.)

Antenna with scape dusted and basal two-thirds of shaft annulate in clay color and fuscous, the outer part mostly blackish, with three pairs of segments broadly annulate with clay color, producing three pale bands (segments 2 and 3, 6 and 7, 10 and 11 from apex). Clay color; palpus with two powdery fuscous transverse bars on each segment; fore and middle tibiae and tarsi fuscous with clay bars, hind tibia clay color, lightly dusted with fuscous, and tarsus barred, but with the light color dominant. Head and thorax also clay color, dusted and shaded with wood brown. Fore wing clay color, with the wood brown dominant in outer part of disc and at lower angle of cell; lightly dusted with fuscous scales, especially along fold and margins, the outer margin with a nearly continuous line in base of dorsal fringe, costoapical margin and base of fringe with obscure bars of blackish dusting, outer fringe powdered fuscous on a clay base. Abdomen, hind wing and dorsal fringe of fore wing mouse gray. 9 mm. Male genitalia characterized by an enormous penis (pl. XLVII, fig. 43).

Porto Rico: Coamo Springs, Apr. 9; type no. 1050, in Cornell University collection.

Aristotelia picticornis Walsingham

1897. *Aristotelia picticornis* Walsingham, Proc. Zool. Soc. 1897, p. 68.

1925. *Compsolechia picticornis* Meyrick, Gen. Ins. clxxxiv, p. 121.

1930. *Anacampsis picticornis* Forbes, Sci. Surv. P. R. xxi, p. 125.

Having taken a true Aristotelia with the characters given by Walsingham for *picticornis,* I refer the species back here. It shows chalky whitish sex-scaling on the disc of the fore wing below and hind wing above, and traces of a costal hair-pencil; also combs on the spurs. The buffy dorsal fringe mentioned by Walsingham is distinct.

Coamo Springs Apr. 6, 10, (male, female).

Aristotelia penicillata Walsingham (p. 117). Coamo Springs, Apr. 9, Isabela, Apr. 24. Shows the "*Eucatoptus*" hair-pencil very strikingly.

Glaucacna new genus

Antenna shorter than fore wing, without pecten; palpus with second segment somewhat rough below, but not tufted, third segment slender, a little shorter; middle tibia with a few loose bristly hairs above, the spurs unarmed; hind tibia with bristly hair above; *the upper spurs at one-third* (below middle in the similar Gelechiidae); the longer upper spur very long, with a strong comb of bristles, the longer terminal one hardly ⅔ as long, with weaker comb. Fore wing Gelechiid-like, with all veins, R_4 an R_5 stalked, M_1 free, M_3 and Cu_1 widely spaced; M_3, Cu_1 and Cu_2 very short, hardly longer than the space between them, the cell being close to the inner margin, though obliquely cut off, and not as in *Blastodacna;* hind wing with a large sex-tuft partly of spinelike bristles, and partly of large scales, much as in *Glauce;* M_1 and M_2 obsolescent, apparently both free; M_3 about as far from Cu_1 as it is from Cu_2.

This is a fantastically aberrant genus; the hind wing has the long drawn-out apex of a specialized Gelechiid, from which it differs superficially only in the high hind tibial spurs; the male genitalia are as in *Blastodacna, Chaetocampa, Parametriotes,* and some aberrant "*Batrachedras*", now standing as Laverdinæ, as in *Durrantia,* now considered a Gelechiid or Xylorictid, and as in *Eucleodora,* now standing as an Œcophorid, which Busck figures as having a similar Gelechiid hind wing, though quite different in the fore wing, but which Meyrick figures with a simple hind wing. The most obvious common character is the pair of gnathos-lobes which are spatulate or knobbed and bear transverse rows of bristles in all these superficially very different genera. The known larvæ have dense secondary hair, unlike any other true micro, and feed on various plants: Crataegus, Croton, Coca and tea.

Glaucacna iridea new species (pl. XLII fig. 15)

Dull ochre. Antenna with base fuscous, obscurely annulate; middle with four alternating bands of fuscous and ochre, each of 2½ segments; apex fuscous with an ochre band on every alternate segment, five in all besides the ochre tip. Palpi with two heavy fuscous bands on second and third segments, on the second nearly covering the surface; head and front of thorax and shoulders darker ochre. Fore wing with basal half ochre, third quarter of wing wood brown on costal ⅔ and ochre below, a blackish spot on costa at middle, from which a wood brown shade-streak extends obliquely in toward inner margin, broadening and becoming very faint toward margin; apical quarter wood brown, mottled, with a blackish discal dot, connected by a dark brown shade to inner margin, and a blackish dorso-apical shade, extending down into fringe; costal and apical fringes

concolorous, dorsal fringe and hind wing with its fringe gray. Hind wing with an expansible pencil of long yellow hairs, outwardly mixed with long spatulate scales, and with some narrow raised scales on the wing-surface below it.

Male genitalia (pl. XLVI, figs. 38, 39) easily distinguishible by the paired spatulate gnathos-lobes with regular series of bristles. 8 mm.

Porto Rico: El Yunque, Apr. 22–23, type and three paratypes, Cornell Univ. type no. 1051.

Empedaula Meyrick

Similar to *Aristotelia*. Second and third segments of palpi blade-like, much wider than in Aristotelia, with a crest of scales on posterior (upper) side. Fore wing more pointed than in Aristotelia, with outer margin bisinuate. Essentially the same pattern occurs in the North American *Aristotelia salicifungiella*.

Empedaula rhodocosma Meyrick

1914. *Aristotelia rhodososma* Meyrick, Trans. Ent. Soc. Lond. 1914, p. 229.

1925. *Empedaula rhodocosma* Meyrick, Gen. Ins. clxxxiv, p. 48.

Palpi whitish with about three diffuse brown bands on second and third segments. Powdery gray, fore wing with a broad oblique chocolate band from before middle of costa, followed by a parallel gray band which is edged with rose scaling, and preceded by a paler shade, which is continued along costa to base, leaving a darker gray triangle on inner margin; outer part of wing much shaded with light gray and pink, with a tendency to longitudinal streaking; the costoapical portion dark. 8 mm.

Guiana, Brazil, P. R.: Coamo Springs, Apr. 10, San Germán, Apr. 16.

Eucordylea Dietz

Closely similar to *Recurvaria* (p. 117). Palpus with second segment rather straight, with a large expansible tuft on inner side (female unknown, presumably without the tuft), third segment considerably shorter. Genitalia essentially as in Recurvaria. In the Porto Rico species M_3 and Cu_1 of hind wing are shortly separate.

I have one species from San Germán, in too poor condition to describe satisfactorily.

Epithectis eromene Walsingham (p. 119). Coamo Springs, Apr. 7–10, Santurce, Mar. 25 (Hoffman); Aguirre, Apr. 2–3, 1931 (Leonard and Mills); also a pale strain apparently of the same species from Puerto Real, Vieques Id., Apr. 28–29.

E. annulicornis Walsingham (p. 119). In this species, while the normal extent of the dark marking is less, leaving the discal dot isolated, the palpus has more fuscous on the second segment, often obscuring the bands, which will distinguish this species from abnormally light ones of the preceding. Larva in nest of *Polistes annularis* (Meyrick, Exot. Micr. i, p. 198).

Coamo Springs, Apr. 4–10, Puerto Real, Vieques Id., Ap. 28–29.

I have several (2 or 3) other species of Epithectis undetermined; among them I think I recognize *E. kittella* Walsingham, from El Yunque.

Schistophila Chretien

Palpus with second segment broadly rough-scaled below, third somewhat shorter, stout and slightly rough below, but pointed; fore wing with raised tufts in fold, with M_1 long-stalked, M_2 to Cu_1 long and nearly parallel, Cu_2 (at least in the Porto Rico species) shorter and a little separated. Hind wing with R and M_1 long-stalked, M_2 curved and approximated to M_3, which is shortly separated from Cu_1.

This genus is transitional between Recurvaria, Epithectis and Telphusa. The only described species (from southern Europe) is reported to have M_3 and Cu_1 remote, and is perhaps generically distinct, but occupies the same general position.

Schistophila fuscella new species

Head and thorax luteous with some light gray scales. Antenna fuscous, annulate with luteous, the annulations toward the tip on every other segment; palpus with outer side of two fuscous, with subapical and apical luteous bars, inner side mostly pale, third segment with two luteous rings and a luteous tip, on a fuscous base. Fore wing with tufts on lower edge of cell at ⅓, ⅔ and at end, and corresponding ones on fold, also one at upper angle of cell; mottled fuscous and dull reddish brown on a luteous base; a black line on lower edge of cell from 2d to 3d tuft; fold contrastingly blackish out to first tuft; base of costa blackish, and a blackish shade along third quarter of costa, abruptly cut off at ¾. Base of fringe barred with black and luteous, with obscure corresponding bars representing terminal line. Hind wing whitish in disc, light fuscous along costal edge and on outer third; dorsal half to end of cell luteous (apparently sex-scaling) shading into the fuscous outwardly. 11 mm.

Porto Rico: El Yunque, Apr. 22; Cornell Univ. type no. 1054.

Telphusa Chambers

Palpus with second segment rough-scaled below as in Gelechia, third slender, normal; fore wing more or less distinctly scale-tufted; venation normal, with R_4 and $_5$ only stalked in fore wing and Cu_2 long; hind wing notched below apex, with R and M_1 approximate,

connate or stalked, M_2 curved and approaching M_3 at base, M_3 and Cu_1 rather shortly but distinctly separate.

A nearly world-wide genus with about 100 species. Two or three more are known from the West Indies.

Telphusa perspicua Walsingham

1897. *Gelechia perspicua* Walsingham, Proc. Zool. Soc. 1897, p. 72.
1925. *Telphusa perspicua* Meyrick, Gen. Ins. clxxxiv, p. 70.

Black-brown, contrastingly marked with yellow, which tends to surround some of the blackish areas and form broken ocellate spots. Three or four raised yellow tufts. Yellow strongest on head, scutellum, and a subapical costal spot. Palpus blackish, banded with yellow. 10 mm.

Haiti. P. R.: Coamo Springs, Apr. 6–10; Puerto Real, Vieques Id., Apr. 28.

Telphusa distictella new species

Similar to *T. glandiferella*. Light dull gray. Palpus with second segment blackish, contrasting, third blackish with two narrow pale lines of dusting on outer side, pale with powdery blackish bars on inner; antenna contrastingly annulate with blackish. Shoulders blackish; legs blackish, narrowly barred with cream at segments, the hind leg paler as usual. Fore wing with the black spot a third way out on inner margin nearly as wide as high, and preceded by a smaller triangular spot at basal angle; a small black dot at lower angle of cell; base of costa with a blackish patch, extending almost continuously to ¼, middle of costa with small blackish dots, alternately larger and smaller, and a larger blackish spot at ⅔; outer part of costa and outer margin barred with small blackish shades; fringe light gray, its base obscurely barred with darker gray. Hind wing with its fringe, and abdomen mouse gray. 10 mm.

Porto Rico: San German, Aug. 20, 1930 (Leonard) Cornell Univ. type no. 1053.

Trichotaphe (p. 120). It is probably best to use this name in the more extended sense generally familiar, and include *Cymotricha*, *Onebala* (*Helcystogramma*) and *Thelyasceta* as subgenera. *Dichomeris*, also treated as congeneric by Durrant, is a little more distinct and may well be held as a genus. Of the three species here added to the Porto Rico list, the first is a Cymotricha, having a well developed fringe of hair on the base of Cu, and the other two would belong to Onebala, with the second segment of the palpus smooth scaled, and R_5 running to the apex.

Trichotaphe (Cymotricha) pectinella new species

Deep iron gray, with faint bronzy iridescence. Antenna very faintly annulate; palpus with second segment contrastingly whitish along the upper side

of the truncate tuft, at apex; third segment pale, blackish along under side and at tip only. Fore wing with costal edge clay color and contrasting, except toward apex; three black discal dots, the first two vertically placed, defined with clay yellow scaling on the outer side of the first one in the cell, before and at the lower outer angle of spot at end of cell, and on outer side of spot in fold; a smaller spot in cell at ⅓, without yellow edging; hind wing the usual gray, with a strong tuft of hair on Cu.

Porto Rico: Coamo Springs, Apr. 10; Cornell Univ. type no. 1055.

Trichotaphe (Onebala) elliptica new species (pl. XLII fig. 19)

Ash gray. Palpus cream yellow, contrasting; legs yellowish white, the outer sides of tibiae banded with light gray. Fore wing with markings blackish, defined with light yellow, a half-oval patch on inner margin, extending nearly across the cell; a small horizontally elongate patch at end of cell, and a blackish costo-apical area, defined on basal side with a strong pale yellow streak, which fades out near middle of wing, the dark patch extending vaguely to anal angle. 11 mm.

This species belongs to the tropical group frequently called *Helcystogramma;* it seems to come nearest to *T. symbolica* Meyrick (Gen. Ins. clxxxiv, pl. iii, fig. 58), but in the latter the pale edging of the apical patch is double, the patch on the inner margin is differently shaped, and the one at the end of cell is replaced by a group of two or three.

Porto Rico: Puerto Real, Vieques Id., Apr. 28; Cornell Univ. type no. 1056.

Trichotaphe (Onebala) melissia Walsingham

1911. *Dichomeris melissia* Walsingham, Biol. Cent.-Am. Lep. Het. iv, p. 97.
1925. *Cymotricha melissia* Meyrick, Gen. Ins. clxxxiv p. 189.
1921. *Lecithocera emigrans* Meyrick, Exot. Micr. ii, p. 435.
1925. *Brachmia emigrans* Meyrick, Gen. Ins. clxxxiv, p. 249.

Deep bronzy umber brown; palpus with second segment broadly and somewhat roughly scaled below, with a ridge-like tuft directed inward along its upper edge, concolorous with a fine yellowish streak on inner face of third segment. Thorax with a contrasting fine yellow V, crossing tegulae obliquely and with its apex on scutellum, as in *T. (C.) trigonella.* Fore wing with fine yellowish markings, and sometimes a chocolate patch over cell and fold beyond middle of cell; base of inner margin cream. 12 mm.

Typical (mainland) specimens differ somewhat, but Busck reports them as having the same genitalia. I am also indebted to him for the synonymy above, and for the biological notes. The species belongs to a different group from the preceding, and appears related to the

South American *T. meconitis* Meyr. Larva a pest on sweet potato (Bourne and Otero).

Panama; Barbados (Bourne, U. S. N. M.). P. R.: El Yunque, Apr. 22; Río Piedras, Jan. 10, 1931 (Mills).

Dichomeris piperatus Walsingham (p. 121). Coamo Springs, Apr. 6, Santurce, Mar. 25 (Hoffman), Cataño, Apr. 21, Isabela, Apr. 11 (larva tying leaves of alfalfa—Exp. Sta.), Puerto Real, Vieques Id., Apr. 29.

D. indignus Walsingham (p. 121). Coamo Springs, Apr. 7, El Yunque, Mar. 29, Apr. 22, 23, Jájome Alto, June 18 (Hoffman).

Thiotricha sciurella Walsingham (p. 122). Puerto Real, Vieques Id., Apr. 28.

Polyhymno luteostrigella Chambers (p. 123). Río Piedras, Apr. 23 (Leonard), Cataño, Apr. 21, Isabela, Apr. 24, Lares, Sept. 20 (Seín), Río Piedras, Sept. 21 (Leonard); Puerto Real, Vieques Id., Apr. 29.

Brachyacma palpigera Walsingham (p. 123). Bottimer reports it from Vachellia, in Texas, in Jour. Agr. Res. xxxiii, p. 812, and gives further references. Coamo Springs, Apr. 5, Puerto Real, Vieques Id., Apr. 28, 29.

Anacampsis Curtis (p. 124). Several additional species were taken of this genus besides the following, but not in condition to describe; I suspect one is *mangelivora* and at least one is new.

REVISED KEY TO SPECIES

1. Palpus with loose hair or a more or less triangular tuft on second segment above 2
   Palpus closely scaled throughout; normally with R_4 and R_5 merely stalked *(Compsolechia)* 6
2. Fore wing with a vein lost, R_4 and R_5 being completely united; fuscous with a blackish antemedial shade across fold, and no discal dot or postmedial markings *(Commatica)* ..... *bifuscella*
   Fore wing with R_4 and R_5 stalked *(Anacampsis)* 3
3. Gray with three whitish costal patches, and third segment of palpus gray; 8 mm. ..... *insularis*
   No pale costal patches, merely a pale postmedial line and blackish dots 4
4. Fore wing with three diffuse larger dark spots, first across fold, second and third the usual discal dots; 13 mm. ..... *lapidella*
   Fore wing with the spot in fold and three on costa alone conspicuous; palpus three-banded ..... *new species*
   Fore wing with five small spots, including one at base of costa; palpus with third segment white; ground paler; 10–12 mm. 5
5. Third segment of palpus triannulate; antenna distinctly annulate ..... *new species*

Second segment of palpus with only basal two thirds black_____*cornifer*
Second segment of palpus blackish with pale apex only__*quinquepunctella*
6. Thorax and base and apex of fore wing black, contrasting____*new species*
Thorax and base and apex of fore wing concolorous_____ 7
7. Antenna black and white_____(see *Aristotelia picticornis*)
Antenna grayish, annulations obscure_____ 8
8. Antenna and palpus more or less gray on yellow; legs yellowish white, hind tibia with a black bar below; fore wing gray with a black patch at basal angle, and no pale even costoapically_____*desectella*
Antenna gray; palpus not yellowish; no basal spot; a pale spot or transverse line at base of costal fringe if any markings are present_____ 9
9. Postmedial line sharply defined and bilunulate_____ 10
Postmedial line faint or diffuse_____ 11
10. Apical fringe with two contrasting black bars_____*meibomiella*
Apical fringe not specially marked (Jamaica etc.)_____*succineta*
11. Expanse 14 mm.; ground powdery, second segment of palpus black, no darker dots on fore wing_____*mangelivora*
Expanse 10 mm.; ground shining; first segment of palpus black only; five discal and terminal dots_____*plumbeolata*

Anacampsis (Commatica) bifuscella new species

Palpus with second segment triangularly scaled, the broad scaling mostly above, third segment about ⅓ longer. Fore wing (pl. XLIII, fig. 7) with R_4 and R_5 completely united; hind wing with R and M_1 well separated at base, but strongly divergent; M_3 and Cu_1 slightly separated.

Ash gray, faintly yellowish and powdered lightly with fuscous scales. Antenna lightly annulate in two shades of gray; second segment of palpus fuscous on outer side and below, tip narrowly white, and tuft and upper side more extensively whitish, third segment slender and whitish, darkening toward tip. Legs light gray, paler-banded. Fore wing with more or less distinct antemedial shades on costa and fold, and middle of costa also shaded with blackish; a strong oblique fascia from cell to or nearly to inner margin, broadly interrupted below the cell, cutting off a rounded spot in cell; a small blackish discal dot, with some dark shading between it and anal angle, and short terminal dashes or elongate dots sometimes connected by a wavy terminal line; fringe warmer and more brownish, with a darker brown central line. Hind wing gray. 8 mm.

A rather distinct little thing. By its structures it would go in Meyrick's genus *Commatica*, but the latter normally has the fine white postmedial line, and I suspect it may be a parallel development from typical Anacampsis.

Porto Rico: Coamo Springs, Apr. 5–10, type and paratypes, San Germán, Apr. 16, Isabela, Apr. 24, El Yunque, Apr. 22–23. Cornell Univ. type no. 1057.

A. (Anacampsis) insularis Walsingham (p. 125) El Yunque, Apr. 23.

A. (A.) new species. Santurce (Hoffman), San Germán.

A. (A.) new species. San Germán.

Anacampsis (Compsolechia) melanophaea new species
(pl. XLII, fig. 16)

Palpus close-scaled, the second segment hardly thickened, third slightly longer. Hind wing bluntly trapezoidal, without fringe on Cu.

Head and body brown-black; palpus with a narrow whitish ring at tip of second segment, third pale on inner face; antenna annulate in two shades of fuscous; scutellum shining buff, contrasting; legs with the usual pale rings, and hind legs paler. Fore wing buff with golden iridescence in male, shading through chestnut into blackish on costa and inner margin, the shades extending about half the length of the wing, the costal one centering a little beyond the middle of the wing, and dorsal one a little before. Base of fore wing black, contrasting, the area extending to basal angle in male, shorter in female; basal half of costa shaded with fuscous in male, connecting the black base and median shade; apex also black, the boundary extending from 5/6 of costa to above anal angle in male, in female more oblique and with incurved inner boundary; female only with a dot in outer part of cell. 13 mm.

I am not quite sure the two specimens are conspecific and make the male the type; the female differs mainly in its duller color, more definite markings, and slightly more restricted black base and tips. The characters if construed strictly would run the species to *Melitoxestis* Meyrick, an African genus.

Porto Rico: El Yunque, Apr. 23 (male type); Coamo Springs, Apr. 9 (female paratype). Cornell Univ. type no. 1058.

Anacampsis (Compsolechia) meibomiella new species
(pl. XLII fig. 17)

Light ash gray. Head and thorax rather darker. Antenna blackish above, with a white dot of a couple of scales on each segment, golden below; second segment of palpus smooth but broadly scaled, with a tendency to transverse seriation of the scaling, but no banding, third segment hardly longer, slender; palpus white, shaded on outer side with gray, the third segment with slender black and white stripes, at least toward tip. Legs dark gray, cut with white. Fore wing pale gray, slightly shining and a little powdered and shaded with white; base of costa and of A blackish; two black antemedial spots which may fuse across the fold, and a point in fold beyond them, and one below fold a little further out; middle of costa with an oblique black band, shaded and extended with bronze brown and ending overlapping the outer side of an oblique black and bronze streak across lower part of cell and sometimes fold; a small black dot at end of cell; outer line somewhat angled at middle, concave above and below, fine and pale and preceded by a broad bronze band, which is defined outwardly with black, at least at costa, and followed by blackish and bronze at costa; marginal area with a cream white longitudinal dash from postmedial band to just above apex and with pale longitudinal streaks dorsally; margin with two heavy black bars below apex, defined and separated by smaller white bars, and preceded by a faint bronze shade; fringe with base golden, outer part gray, separated by a blackish subbasal line. Hind wing gray. 9 mm.

Apparently close to *repandella*, the type of *Compsolechia*, but distinguished by the two black marginal bars from the other species known to me, and from most of this group by the absence of striation on the palpus. The Porto Rico specimen (figured) is paler, smoother looking and more lightly marked than the types from Cuba, but the markings are identical.

Cuba (no. 9454) bred from *Meibomia* in U. S. National Museum, also a collected specimen from Santiago (type and paratypes). Porto Rico: San Germán, Apr. 16, paratype No. 1059 in Cornell University.

A. (C.) mangelivora Walsingham (p. 125). El Yunque, Apr. 23 (?). Too poor for certainty.

A. (C.) plumbeolata Walsingham (p. 125). Coamo Springs, Apr. 10, apparently not typical.

Phthorimaea Meyrick (p. 125) will probably have to be sunk to *Gnorimoschema* Busck which has priority. All the Porto Rico species yet known belong to Phthorimaea.

P. operculella Zeller (p. 126). This species sometimes has the white scale-tips more normal in Gnorimoschema; perhaps always when perfectly fresh. *P. gudmannella*, as identified in the National Museum, is much smaller, and more contrastingly mottled, with the cream-white ground visible in considerable areas, especially toward the apex. Coamo Springs, Apr. 6–10, Isabela, Apr. 24, San Germán, Apr. 16, Jájome Alto, June 16 (Hoffman); Puerto Real, Vieques Id., Apr. 28.

P. striatella Murtfeldt (p. 127). Cataño, Apr. 21.

Gelechia salva Meyrick (p. 126). If I have this species determined correctly it is a true Gelechia, with third segment of palpus slender, and R and M_1 of hind wing stalked. Coamo Springs, Apr. 4–10, San Germán, Apr. 16.

Stegasta capitella Fabricius (p. 129). Coamo Springs, Apr. 4–10, Isabela, Apr. 24, San Germán, Apr. 16, Aguirre, April 15, Cataño, May 16 (Leonard and Mills); Río Piedras, Aug. 8 and Lares, July 18 (Leonard), Aguirre, Apr. 2–3, 1931 (Leonard and Mills); Vieques Id., Apr. 28–29. A common species. For venation see pl. XLIII fig. 8.

S. bosquella costipunctella Möschler (p. 128). The Porto Rico form as seen in series is a distinct race, with the pale part of the fore wing varying from pink to an almost concolorous gray; none of the specimens show the clear orange of typical *bosquella*. Specimens in the U. S. National Museum from Santo Domingo are typical

bosquella, but some from South America approach the Porto Rico form. San Germán, Apr. 16, Puerto Real, Vieques Id., Apr. 28–29.

[*Platyedra gossypiella* Saunders (p. 129). Haiti: Petionville, June 13, (Fulda); Santo Domingo: Monte Cristi, Apr. 4–5, bred from cotton boll,—Ins. Exp. Sta.]

Xyloryctidæ

The following species was described as a *Gelechiid,* and is so treated in the preceding paper (p. 120), but in fact is a member of a small New-World group of aberrant Xyloryctidæ, typified by the genus *Durrantia.* Œgoconia may possibly also be related. In placing the Antillian *Brachmia fulvidella* Wals, in Paranoea, Meyrick obviously mistook the rudiment of 1st A for Cu_2; *Paranœa latescens,* the genotype, is a true Gelechiid.

Schistonoea new genus

Head and thorax smooth with decumbent scaling, palpus close-scaled, upturned beyond vertex, with third segment practically as long as second, slender and pointed; tongue normal, ocellus absent; hind tibia with loose hair. Fore wing (pl. XLIII, fig. 9) oblong, four times as long as wide, R, arising beyond middle of cell, R_2 nearer R_1 than R_3, which is stalked with $R_4 + _5$, R_4 and R_5 completely united, M_1 running to apex, free; M_2 free, M_3 short-stalked with Cu_1, Cu_2 absent; 1st A very weak but traceable, but anal space much broader than usual in the Gelechiidae; 2d A deeply forked at base. Hind wing trapezoidal, wider than fore wing, fringe ⅔; Sc closely parallel to R on basal half of cell, the cross-vein (R_1) not visible, R and M_1 stalked moderately, M_2 curved and approximate to M_3, which is connate with Cu_1; Cu_2 arising at ⅔, 1st A and 3rd A rudimentary, 2d A weak; no fringe on Cu.

Genotype *Brachmia (?) fulvidella* Walsingham.

Schistonoea fulvidella Walsingham (p. 120). Coamo Springs, Apr. 9, 10, Isabela, Apr. 24, Santurce, Mar. 23 (Hoffman), San Germán, Apr. 16, Dorado, May 30 (Hoffman); Puerto Real, Vieques Id., Apr. 29; Culebra Id. (Busck—NM). St. Thomas, Charlotte Amalia, Aug. 11 (Leonard). The U. S. National Museum has a closely related species from Haiti, with R_3 of fore wing hardly stalked.

Œcophoridæ

[**Hypercallia** Stephens

Palpus long, upturned far beyond vertex, third segment much shorter than second, both with tufts on upper side near apices, but the third with a fine apex extending beyond the tuft. Antenna very shortly ciliate. Wings very broad, squarish (variable in form in the

genus); R_4 and $_5$ forking over apex, Cu_2 strongly curved, and rather close to Cu_1 at origin. Hind wing M_2, M_3 and Cu_1 shortly spaced at origin.

A true Œcophorid, related to *Cryptolechia*. The genus is widespread, but missing from the United States and Canada. The only known larva bores in stems of *Polygala;* possibly the Antillian species may be found on the "Violet-tree" (*Phlebotaenia*).

Hypercallia rosacea new species (pl. XLII fig. 18)

Purple-brown. Head and thorax largely mixed with red and yellow; fore wing with costal edge red, costa with yellow patches near base, before middle and at ¾; a cluster of white and yellow antemedial spots, and a white slightly raised bar at end of cell, outlined with blackish below, but surrounded with yellow and red brown; all the markings outlined in red. Fringe on upper ⅗ of outer margin yellow with red basal line, the rest dark gray. Hind wing pinkish. 17 mm.

Haiti: Petionville, June 13 (Fulda), type in Cornell Univ. collection, no. 1060; Santiago, Cuba, June (Schaus), two paratypes in U. S. National Museum. The Cuban specimens are somewhat smaller and paler, and have a round white dot at the end of the cell, corresponding to the lower end of the bar; they presumably represent a distinct subspecies.]

[*Ethmia notatella* Walker (p. 133). Haiti: Petionville, May–June (Fulda).]

E. kirbyi Möschler (p. 133). Coamo Springs, Apr. 7.

E. confusella Walker (p. 134). Common. Coamo Springs, Apr. 4–10, San Germán, Apr. 16–17, Puerto Real, Vieques Id., Ap. 28–29.

[*E. abraxasella* Walker (p. 134). Haití: Petionville, May–June (Fulda).]

Ethmia joviella Walsingham

1897. *Ethmia joviella* Walsingham, Proc. Zool. Soc. 1897, p. 90.

Smaller than the other Porto Rico species. White; fore wing with about eight black dots; hind wing gray with white fringe. 14 mm.

Grenada. P. R.: Isabela, Apr. 24; Río Piedras, Sept. 21 (Leonard).

Triclonella rhabdophora Forbes (p. 135). (Pl. XLII fig. 20). Puerto Real, Vieques Id., Apr. 28–29, common.

COLEOPHORIDÆ

Coleophora pulchricornis Walsingham (p. 138). Coamo Springs, Apr. 4–10; Puerto Real, Vieques Id., Apr. 28.

At least two other species of Coleophora were taken, which I believe new.

GRACILARIIDÆ

Spanioptila spinosum Walsingham (p. 141). Coamo Springs, Apr. 4–10.

Acrocercops sanctaecrucis Walsingham (p. 141). Coamo Springs, Apr. 10, Las Cruces (Cidra), Mar. 28. Mr. Busck tells me *A. undifraga* Meyrick, from Haiti (Exot. Micr. iv, p. 47), bred from Solanum torvum, is a synonym of this species.

A. albomarginata Walsingham (p. 142). This species was described as a *Coriscium*, but transferred by Meyrick to *Parectopa*. It shows the tibial armature of *Acrocercops*, and no doubt belongs there, where the triangular palpus is a normal feature. I suspect that *P. attenuatum* should also be transferred to Acrocercops.

P. R.: Coamo Springs, Apr. 5, 6.

Acrocercops pontifica new species (pl. XLII fig. 24)

Ochre yellow, marked with silver. Head white, sides yellow above eyes; palpus long, slender, upturned; cream, shading into ochre toward base, a gray dot at tip of second segment; maxillary palpi minute; antenna light brown, half longer than fore wing; thorax white in center, ochre on sides; abdomen gray above with a golden gloss; shaded with yellow on sides, white below with oblique subventral brown stripes. Hind legs with several rows of long fine spines above, the upper spurs at ⅓. Fore tibia and tarsus fuscous, vaguely banded, middle tibia and tarsus dirty white, with fuscous bands; hind tibia light yellow with a white tip, tarsus white with golden bars on segments.

Fore wing bright ochre, costal half marked with two light lead-gray lines, bordered with darker lead-gray; a stripe from base of costa, gradually curving away from costa and ending in upper part of cell at ⅝ length of wing; a very oblique straight line at ¾; dorsal half with a silver white stripe from base to ⅝, divided into three parts by the ochre ground, the first section narrow, the other two equally broad and divided by a very oblique stripe; a lead fascia across apex, narrowed in the middle, turning in at inner margin and joining the apex of the silver white stripe; a black apical dot. Fringe light gray, becoming white on dorsum, with a lead gray basal line around apex. Dorsal fringe and hind wing mouse gray. 9 mm.

Apparently related to *A. leuconota* Z. from Colombia. In that species the shoulders and base of the fore wing are gray-brown, and the dorsal stripe is only once interrupted.

Porto Rico: El Yunque, Apr. 23, Cornell Univ. type no. 1061.

Acrocercops cymella new species (pl. XLII fig. 23)

Palpi slender, upturned, close-scaled, the third segment slightly blade-like; maxillary palpi obsolete; spines of hind tibia short and fine, the spurs at ⅓;

antenna much longer than fore wing. White, somewhat shining. Second segment of palpus and antenna luteous; head and thorax immaculate, abdomen light gray, paler below with traces of oblique banding. Fore legs luteous, banded with light brown, the last two segments white; hind leg white, apex of tibia with a blackish patch, and segments marked with fuscous.

Fore wing white, marked with shining fuscous gray, middle fifth occupied by a fuscous patch, which breaks into coarse striae at inner margin; a smaller and intenser patch at ⅝, breaking into two striae at each margin; three coarse wavy striae between the two patches, the first partly fused with the median patch; and a blackish apical spot. Fringe and hind wing with fringes light fuscous. 13 mm.

A striking species. Porto Rico: Coamo Springs, Apr. 10; Cornell Univ. type no. 1062.

Acrocercops zebrulella new species (pl. XLII fig. 21 male, 22 female)

Palpus rather stout with segments marked, not tufted; maxillary palpi obsolete; antenna longer than fore wing; hind tibia strongly spined above and weakly below, the upper spurs at ¼; first two segments of middle and hind tarsi with whorls of spines, cream, shaded with pale gold or buff.

Male. Fore wing (pl. XLIII, fig. 10), obliquely truncate at apex, the actual apex being far below the axis of the wing. Head pale gold; palpus with second segment more or less infuscated, third with two fuscous bars, the more basal practically covering the basal half of the segment; antenna with two blackish bars on scape, shaft yellowish, annulate with fuscous; thorax with blackish bars across front of disc and base of scutellum. Fore wing light buff, marked with dull black; costa yellowish, with a series of seven black bars on basal half, the first basal, 5th and 6th slender with the ground whitish between them, 7th strongly oblique out; dorsal part of wing with some thinner bands to correspond, the first and second with whitish ground between them, also the 3rd and 4th, which almost join the 5th and 6th costals; 5th bar thicker, oblique, and running into the oblique fascia across the wing; middle of wing with a straight oblique fascia from beyond middle of costa to before middle of inner margin, dividing into two bars at costa; a round black (blue-iridescent) dot on lower edge of cell (at origin of Cu_2), followed by two parallel oblique black bars in disc and two across apex, these last not reaching margins. Apex beyond last bar deeper buff; fringe cream, the basal part buff with strong violet iridescence. Apical spot not definitely present, but violet apical portion showing as an indefinite black spot in some lights. Hind wing mouse gray; abdomen mouse gray above, below whitish with several oblique lines, the last one blackish and the others buff.

Female. Palpus pale with two dark rings. Fore wing normal in form, symmetrical; antenna with pale apex, and two pale segments, the 9th and 11th from the apex. Ground of fore wing varied, yellow and white, without distinct blue or violet iridescence; the basal and median bands indescribably confused, but more or less corresponding to those of the male; the oblique median one not really traceable, and represented on the costa by 3 or 4 stout striae; the following black dot obsolete; the two oblique fasciae less longitudinal; the subapical pair of fasciae reaching the margins, and the first one double; spining on legs weaker.

Legs in both sexes with black bars, the second segments of middle and hind tarsi with a much stronger bar than the first segments. 7 mm.

A striking little thing; obviously near *A permixtella* Wlsm., but evidently differing in the blackish markings on appendages and thorax, and in details of pattern. I know of no comparable case of sexual dimorphism in the group.

Porto Rico: El Yunque, Apr. 23, type male and paratype male and 2 females, Cornell Univ. type no. 1063.

I have three more species of *Acrocercops* from Porto Rico not suitable for description.

Gracilaria aeneocapitella Walsingham

1892. *Gracilaria aeneocapitella* Walsingham, Proc. Zool. Soc. 1891, p. 539.

1897. *Gracilaria aeneocapitella* Walsingham, Proc. Zool. Soc. 1897, p. 152.

Tawny, the costa except at base golden yellow, with purple iridescence and dark brown flecking, especially on costa and toward apex.

St. Vincent. P. R.: Lares, Sept. 20 (Seín).

LYONETIIDÆ

An undetermined species was taken on El Yunque, Mar. 29.

Compsoschema Walsingham (p. 145). Fletcher considers this genus a synonym of Lyonetia.

OINOPHILIDÆ

Ereunetis lanceolata Walsingham should be transferred to *Comodica* Meyrick, distinguished by the separation of R_4 and $_5$ on the fore wing, and the following references should be added:

1881. *Argyresthia zebrina* Butler, Ann. Mag. Nat. Hist. (6) vii, p. 403, (which has priority).

1907. *Ereunetis zebrina* Walsingham, Fauna Hawai. i, p. 715, pl. xxv, fig. 16.

1914. *Comodica lanceolata* Walsingham-Durrant, Biol. Cent.-Am. Lep. Het. iv, p. 346.

Ereunetis aeneoalbida Walsingham, (p. 148). San Germán, Apr. 16; Aguirre, Aug. 1 (Leonard).

Three more species of *Ereunetis* were taken, but not in condition to describe.

Psychidæ

Oiketicus kirbyi Guilding (p. 150). Dorado (case only).

Tineidæ

Porto Rico and Vieques would appear to be rather rich in Tineidæ, especially of the fungus feeding and scavenger types. The material of the Tinea group proves to have several types of structure, and so I am using several genera. I am not at all sure that I have correctly interpreted all of them and the placing should be viewed as tentative, but at present our entire classification of the family should be viewed as a merely temporary scaffold. As to the geographical distribution of the various types nothing can safely be concluded as yet, and it must not be assumed that species standing now for somewhat superficial reasons in one genus are necessarily closely related in fact; but in an old family like the Tineidæ world-wide distribution is much more to be expected than in a more modern one like the Tortricidæ, and I am inclined to believe that several of these genera will really prove of world-wide distribution.

The primitive group typified by *Eudarcia* is of special interest. In my Lepidoptera of New York I included them in the Incurvariidæ, with which their possession of a full coat of aculeae seemed to associate them. We now have females of the genera *Meessia, Eudarcia* and *Protodarcia* and find they have already developed the modern reproductive system characteristic of all the higher Lepidoptera from the Tineidæ up, while the Incurvariidæ have quite a different type. So we must consider these forms as practically Tineidæ, but they will certainly make a distinct primitive group almost worthy of family separation. It is interesting that Porto Rico not only has a distinct genus of this group, with three species already known, but also that its species of two more genera show a few surviving aculeæ on the disc, while the Tineidæ dominant in the temperate zone have lost them completely.

The following key will separate those genera which would run to the genus *Tinea* in the former one:

8. Fore wing with R_2 and R_3 stalked as a result of the loss of the closing vein of the accessory cell; antenna with two whorls of scales to each segment; wing membrane aculeate ..... *Protodarcia*

Fore wing with R_2 and R_3 arising separately from the cell, or from an accessory cell distinctly closed at its outer end; antenna with a single whorl of scales on each segment except near base; wing membrane rough, but not aculeate, or only about basal part of cell 9

9. Fore wing with R_5 and M_1 stalked from end of cell, or floating free and pointing in such a direction that if extended they would meet well beyond end of cell; hind wing with cell open below M_3, veins very weak__ 10
Fore wing with R_5 and M_1 arising separately from cell; hind wing with cell formed_____ 11
10. Fore wing with all veins present, eyes large_____*Homostinea*
Fore wing with one vein lost, eyes small_____*Achanodes*
Fore wing with two veins lost, hind wing with one_____*new genus*
11. Head and hind tibia with short vestiture, fore wing with R_1 arising beyond middle of cell_____*Lepyrotica*
Head and hind tibia with long hair, R_1 typically arising near base_____ 12
12. Hind wing narrower, with sinuate costa, and cell close to inner margin, fore wing with 2d A simple_____ 13
Hind wing broader; fore wing with 2d A forked at base_____*Tinea*
13. Hind wing very narrow, with deeply sinuate costa, Sc reaching margin well before middle; fringe about 4_____*Mea*
Hind wing lanceolate; Sc ending at ¾; fringe less than 2__*Infurcitinea*

Setomorpha insectella Fabricius (p. 152). Río Piedras, in wasp nests (Seín). A general scavenger.

New genus, new species

A specimen each from Coamo Springs and Palmas Abajas (Hoffman), but not in condition to describe. (Pl. XLV fig. 11).

Achanodes Meyrick

Similar to Tinea. Antenna with pecten. Fore wing (pl. XLV, fig. 13), with one dorsal vein lost (M_3); R_5 and M_1 forking over apex; 2d A simple; hind wing narrower, fringe about 2, lanceolate, without sinuate costa, and Sc long; M_1 and M_2 stalked, forking over apex, M_3 associated with them; Cu separate, widely forked. In the Porto Rico species the antenna is smooth-scaled with one whorl to a segment, the eyes are small, and in the fore wing R_4 and M_2 arise from the base of the stalk of R_5 and M_1.

Besides the following I have a species from Orlando, Florida, which is very close to *A. sympathetica* Meyrick if not the same. It is similar to the following, but is smaller with weaker veins, M_1 and $_2$ of the hind wing being obsolescent. The hind wing is without sex-scaling.

Achanodes antipathetica new species

Dull ochre or light wood brown, more or less dusted with fuscous. My material comes in two quite distinct colorings, but there appears to be no difference in structure or markings. The series are mostly females, but the three males represent both forms.

Light form. Head dull light brown, between clay color and wood brown, with a certain proportion of fuscous hairs; palpus concolorous, with a contrasting fuscous patch occupying all but the tip of the third segment, but second segment

pale; antenna concolorous, barred for a greater or less distance on the outer side with blackish, the *pedicel* (narrow second segment) large and contrastingly blackish. Thorax and fore wing rather evenly dusted with light fuscous, without any markings, grading into a darker shade along costa, and with the costal edge nearly solidly fuscous. Hind wing in male completely covered with dense sex-scales, those on the costal ⅔ large and pointing obliquely down and out, then a narrow zone of smaller nearly longitudinal scales and inner margin with a series of long scales pointing up and out for half the length of the wing, and a second set overlying the fringe on the basal fifth or so. Female hind wing grayish, normal. Fore and mid tibiae and tarsi fuscous with luteous tips of segments and a bar across middle of tibia.

Dark form. Identical with light form in sex-scaling and markings, but head darker brownish fuscous, of a mixture of shades, and fore wing heavily dusted with fuscous, the costa rather broadly solid fuscous. 9 mm.

Porto Rico: Santurce, Mar. 25 (Hoffman) holotype male (light); paratypes from Coamo Springs, Apr. 4–10 (both light and dark); Isabela, Apr. 24 (both); Dorado, June 15 (Hoffman) (light); San Germán, Aug. 20 (Leonard) (dark), San Juan, Aug. 30 (Mills); Puerto Real, Dec. 12 (Leonard); Vieques Id., Apr. 29, (dark). Cornell Univ. type no. 1064.

Homostinea Dietz

Similar to *Tinea.* Fore wing (pl. XLIV fig. 12) very narrow, with veins R_5 and M_1 stalked (the stalk obsolete in the Porto Rico species, leaving the veins floating), the stalk normally out of the base of M_2, but free in the South American *H. (Xystrologa) invidiosa* Meyrick. Hind wing with cubital stem entirely free from medial, in the Porto Rico species running close to inner margin and obscurely forked; all the veins being hardly more than deflections of the wing-membrane.

Only 3 or 4 species are known, all American.

Homostinea tischeriella (p. 156 as *Tinea*). One of our specimens is very fresh and has a purple iridescence on the dark part of the fore wing. The antenna has the scaling decumbent and is light gray, only appearing annulate under a low power.

El Yunque, Mar. 29 (rubbed); Apr. 22 (fresh).

Infurcitinea Spuler

Similar to *Tinea,* but with 2d A of fore wing (pl. XLIV fig. 14) simple at base. Hind wing typically with M_1 and $_2$ stalked but approximate in *I. bimaculella.*

The following species are put here on venational characters; they do not look much like the type, the European *I. argentimaculella.*

The North American "*Tinea*" *bimaculella* is not a Tinea, but is fairly close to the Porto Rico species. *Meessia*, to which Fletcher sinks the genus, has aculeate wing-membrane, and is hardly distinct from *Eudarcia;* the following species has a small patch of aculeae about the base of the cell, as in some other Tineid genera. The *granella* group of Tinea has a good deal the same wingform, but the costa of the hind wing is sinuate.

Infurcitinea palpella new species

Dark clay color or light wood brown, dusted and marked with grayish fuscous; head wood brown, darker about the edge of the eyes and base of antennae; palpi heavily mottled with blackish, tending to form blackish bars on each segment, bristles black; maxillary palpi also barred; antennae mouse gray, the single row of scales covering the outer ¾ of each segment; the narrow naked bases appearing as pale annulations with low power; scape blackish with paler pecten. Thorax wood brown dusted with blackish, the tegulae blackish with pale tips, and contrasting. Fore wing broad, heavily dusted and shaded with fuscous, especially on the costal half, where the fuscous may be nearly solid; base of costa blackish, sometimes connected by an oblique shade to the first dark spot in the fold; fold with two large vague squarish nearly black patches, the ground more yellowish before and between them; a similar patch beyond middle of cell, with a patch of the lighter ground between it and end of cell; end of cell with a slight dark mark. Outer part of wing more coarsely mottled, the dark tending to gather in a spot in middle; fringe concolorous, dusted with light scale-tips. Hind wing and abdomen light gray. 8 mm.

There is quite a little variation in the relative amounts of ground and fuscous, but the three dark spots are always distinct in light specimens and the three corresponding pale ones in dark specimens. *Infurcitinea bimaculella*, from the U. S., is related, but is larger and more brilliant, and has M_1 and $_2$ free.

Porto Rico: Puerto Real, Vieques Id., Apr. 28–29 (type and paratypes); Cataño, May 16 (Leonard and Mills) paratypes. Cornell Univ. type no. 1065.

Infurcitinea luteella new species

Hind wing with M_1 and M_2 stalked.

Luteous, head with a few brown hairs at base of antenna only; palpi lightly infuscated on outer side of second and third segments, the maxillary palpi with very little fuscous; antenna gray, paler than the preceding, deep fuscous at base. Thorax heavily dusted with fuscous, the shoulders blackish; fore leg with pale rings on all segments, femur lightly infuscated. Fore wing heavily dusted with fuscous, especially toward apex, fringe concolorous; hind wing light gray. 8 mm.

Porto Rico: Puerto Real, Vieques Id., Apr. 29; type and paratype. Cornell Univ. no. 1066.

Lepyrotica Meyrick

Similar to *Tinea*. Head with short vestiture; palpus as in Tinea, antenna ¾ fore wing, close-scaled; hind tibia rough-scaled below only, smooth above. Fore wing with R_1 arising beyond middle, Cu_2 from angle of cell; hind wing with M_1 and $_2$ stalked; fringe ⅕. The genus is monotypic.

Lepyrotica scardamyctis Meyrick

1921. *Lepyrotica scardamyctis* Meyrick, Zool. Meded. vi, p. 199.
1927 *Lepyrotica scardamyctis* Meyrick, Exot. Micr. iii, p. 326.

White, dusted lightly with gray, with a few gray flecks and black dots, the most persistent being in the cell (several in female, one in male). 13 mm.

Bermuda. "Leeward Islands" (Von Hedemann—Meyrick). Von Hedemann collected mainly in St. Thomas and St. Croix; as in several cases Meyrick has recorded this material as if from the Leeward Islands, it is probable this is another case, and that the material really came from the Virgin Islands.

Mea Busck

Similar to Tinea; antenna with one whorl of long scales to each segment, covering the segment. Fore wing (pl. XLIV, figs. 16, 17) narrow, cell nearer dorsal than costal margin; M_2 and $_3$ stalked, Cu_2 sometimes obsolescent. Hind wing nearly linear, fringe 4, costa deeply sinuate, with Sc ending before its middle, all veins separate though weak.

A small North American genus. The following species will fall in the group with *M. bipunctella*, and the genus will probably also include "*Tinea*" *cretella* from Haiti, which seems closely related to *M. incudella*.

Mea incudella new species (pl. XLII fig. 26)

White with black markings. Head with tuft white, the face blackish, shading into wood brown below, especially on the bases of the hairs; palpi black on outer side, with black bristles; antenna over ¾, shining lead gray, not annulate. Thorax white with black shoulders.

Fore wing chalky white; an irregular black patch on basal third of costa, widest beyond its middle, and followed immediately by a small longitudinal black bar before middle of costa; a black triangle opposite end of cell, bounded by vein R_2, with a raised black discal dot below it; outer part of wing beyond cell dusted with light brown scale-tips, the dusting extending in along inner margin far toward base. Fringe whitish with blackish scale-tips, which gather to form a small dark apical fleck. Hind wing light gray, with light brown fringe. 9 mm.

Porto Rico: El Yunque, Apr. 22–23, Mar. 29, type and paratype; Santurce, Mar. 25 (Hoffman), paratypes. Cornell Univ. type no. 1067.

Mea yunquella new species (pl. XLII fig. 25)

Similar to the preceding species, larger, heavier, the hind wing wider with more sinuate costa.

Cream color or bone white, marked with black. Vertex cream; facial tuft including area between antennae black, the hair-bases paler; palpi mostly black, maxillary palpi pale, the two terminal segments whitish, contrasting; antenna lead-gray, scape black; thorax cream, the tegulae with pale apices.

Fore wing cream, shading into light red-brown outwardly and toward inner margin, the part beyond the cell more mottled, rough-scaled, and shading into the blackish apex. Costal area black, contrasting, its lower boundary very irregular, widened broadly at about ⅓, and triangularly at apex of cell, very narrow between, and almost interrupted by some short whitish striae. Inner margin vaguely shaded with blackish except at base, widening into a spot at ⅔ and a smaller one opposite end of cell; a black discal dot. Outer margin vaguely barred with groups of whitish scales, especially near anal angle. Fringe pale brownish gray, the basal half flecked with blackish; hind wing and fringe light brown-gray. 10 mm.

Porto Rico: El Yunque, flying about the face of a cliff near the summit; Mar. 29. Cornell Univ. type no. 1052.

Another white species of *Mea* with gray dots, and one vein lost in fore wing (pl. XLIV fig. 17) may possibly be *Tinea fragilella* Wlsm., described from Haiti.

Tinea pallidorsella Zeller (p. 156). The ground is wood brown, and in our fresh specimen the dark flecks show a distinct violet iridescence. El Yunque, Apr. 22.

T. brevistrigata Walsingham (p. 157). R_1 arising from cell at about ¾, well beyond the base of the obscure accessory cell, a small patch of aculeæ in base of cell; hind wing broad, with long Cu_1 and $_2$ and long-stalked M_1 and $_2$. Puerto Real, Vieques Id., Apr. 28–29. Aguirre, Apr. 2–3, 1931 (Leonard and Mills).

T. scythropiella Walsingham. Structure much as in the last species. El Yunque, Apr. 23, Palmas Abajo, June 23 (Hoffman); Cataño, May 16 (Leonard and Mills); Puerto Real, Vieques Id., Apr. 28–29, not rare.

T. familaris Zeller (p. 159). A true Tinea (pl. XLIV fig. 15), with R_1 arising near base, and well before the distinct accessory cell, no aculeæ, and M_1 and $_2$ of hind wing separate. Coamo Springs, Apr. 9, Puerto Real, Vieques Id., Apr. 28, 29.

Protodarcia new genus

Fully aculeate. Head densely hairy, especially on front; antenna smooth with *two* regular whorls of scales to each segment, the outer one only a little erected, nearly as long as fore wing, pecten present; ocelli not seen; palpi with second joint with some loose hair-scales and a terminal whorl of bristles, third fusiform, scaled; maxillary palpi folded, much longer than in Tinea, being nearly as long as labials; hind tibia with long hair above and below; female abdomen with two terminal segments telescopic, membranous, and each provided with a pair of tendons as in Tinea and higher forms, ovipositor membranous, with fine sense-setae; vagina separate from oviduct.

Fore wing lanceolate, the apex of membrane somewhat extended (pl. XLIV, figs. 18–20); R_1 arising at ⅘, R_2 and R_3 stalked by the loss of the end of the accessory cell; R_5 and M_1 stalked from end of cell, forking over apex (unlike *Eudarcia* and *Meessia*); one dorsal vein lost, the rest free and subequal; 2d A simple at base. Hind wing ⅔ with fringe 3; costa sinuate with Sc short; M_1 and M_2 connate and approximate to R; cell open below them, and M_3 lost, the point of closure of the cell marked by a slight angulation in Cu_1; Cu_2 and the part of Cu_1 beyond the angulation short.

This description is based on *P. bicolorella,* the genotype. The other two species have suffered further reduction and may be separated generically when the group is better known. The combination of stalked R_2 and $_3$, R_5 and M_1, separate this genus from any known Tineidæ or Incurvaridæ, save *Demobrotis* from Australia, which is perhaps related. I suspect that *Tinea plutella* Walker, described from Venezuela, also belongs here.

The larva of *Meessia* lives in a flat case, and feeds on lichens; that of the Australian *Demobrotis* in a cylindrical case.

The genotype is *P. bicolorella,* described below.

Protodarcia bicolorella new species (pl. XLII fig. 27)

Structures as given in generic description.

Head black above, face white, with some gray hairs above mouth; both palpi blackish, the bristles on labials black; antenna dark gray, faintly annulate, becoming black at base. Thorax white, the anterior edge and shoulders blackish; fore legs blackish in front, with only tip of tibia pale, middle legs dark gray and hind legs pale gray with tips of segments whitish. Fore wing dark gray, mottled with black, and outwardly with whitish; dorsal third occupied with a white stripe which lies mostly below the fold, but is extended across to the costa at base, and before the anal angle shortly crosses the fold, and is nearly cut into three rounded spots by extensions of the black ground; costa with whitish bars, extending across fringe; dorsal fringe mottled with whitish and nearly black, with a suggestion of barring. Abdomen and hind wings light gray. 7 mm.

A striking little thing, with a noticeable resemblance to *Tholerostola evippella.*

Porto Rico: Coamo Springs, Apr. 4–7 (type and paratypes); San Germán, Apr. 16; Aug. 20 (Leonard), Río Piedras, Aug. 23 (Leonard), and Puerto Real, Vieques Id., Apr. 29, paratypes. Cornell Univ. type no. 1068.

Protodarcia argyrophaea new species (pl. XLII fig. 28)

Antenna ¾ fore wing, more slender, with outer whorl of scales more raised; maxillary palpi much longer than labials, the latter with weak bristles; bristles on scape disorganized, hardly forming a pecten; fore wing as in *P. bicolorella;* hind wing narrower, fringe rather less than 3; similar to *P. bicolorella,* but with M_1 arising out of base of free part of R, M_2 approximate and Cu simple, two veins being lost.

Tuft white, mixed with light gray; face blackish on sides, becoming solidly blackish above mouth; palpi luteous with some fuscous on tips of labials; antenna luteous with scape whitish, and shaft with a dark dorsal line, of alternate black and very dark gray rows of scales; thorax whitish with gray-brown tegulae. Fore legs mixed black and white, middle and hind legs largely white, shaded with very pale brown. Fore wing light gray-brown, with irregular silvery white transverse lines; some confused marks at base, first line at ¼, irregular, erect; second at middle, forked at costa; third to anal angle, forked toward the anal angle and sending its outer branch to outer margin; fifth short, costal, sometimes joining the outer branch of the fourth; a short stria across apex, enclosing a blackish apical area. Fringe with a blackish basal line on costa and apex, cut by the last two silver lines. Hind wing and abdomen pearl gray. 7 mm.

A striking species, which would seem to come very near to Demobrotis. Meyrick describes the latter genus as having two dorsal veins lost on the fore wing and 2d A forked at the base.

Porto Rico: Coamo Springs, Apr. 10, type and paratype, Cornell Univ. type no. 1069.

Protodarcia plumella Walsingham (p. 159, as *Tinea*). Maxillary palpi longer than labials. Fore wing with closing vein of the accessory cell from stem of R_{2+3} to R_4, barely visible in a favorable light; R_4 connate with R_5 and M_1; hind wing with M_1 and $_2$ connate, barely separated from R; Cu simple, very weak, free. San Germán, Aug. 20 (Leonard). (pl. XLIV fig. 20).

Acrolophus (Pseudanaphora) arcanellus Clemens

1859. *Anaphora arcanella* Clemens, Proc. Acad. Nat. Sci. Phil. 1859, p. 262; Tineina N. Am. pp. 57, 58, 1872.
1887. *Pseudanaphora arcanella* Walsingham, Trans. Ent. Soc. Lond. 1887, p. 170.
1900 *Pseudanaphora areanella* Dyar, Can. Ent. xxxii, p. 310.
1924. *Acrolophus arcanellus* Forbes, Cornell Mem. lxviii, p. 121.

Palpus rather higher than vertex, and leaning only a little backward; eyes hairy, with a horizontal fan-like tuft of lashes in front; veins all separate; male antenna moderately laminate. Male genitalia with uncus of two well separated spines, gnathos divided and valves nearly simple, rather truncate at ends. Fore wing fuscous, mottled and spotted with blackish. 20 mm.

There is some local variation, which may prove worth race names on further study, especially as there seem to be corresponding very slight differences in the genitalia. Jamaica has another race or very closely related species. The Porto Rico specimen is small and more contrastingly marked than usual, but is nearly matched by one from Cayamas, Cuba.

Eastern United States. Cuba (U. S. National Museum). P. R.: Río Piedras, Aug. 28 (Mills).

Pseudanaphora new species (p. 162). Aguirre, May 22 (Leonard).

Acrolophus triatomellus Walsingham (p. 163). Six specimens from Puerto Real, Vieques Id., (3 male 3 female) appear to belong to this species. They are very close to my *triformellus*, but in all three males the first segment of the midtarsus is close-scaled, while in *triformellus* it has some hair on the upper side, and the tuft on the tibia appears to be much smaller also. Superficially the three males show the vertical series of white scales mentioned by Walsingham, and one also has several scattered white scales on the veins toward outer margin. The genitalia are like those of *triatomellus* (fig. 8 of the first report) but seem a little more hairy and more heavily constructed.

Another specimen from Puerto Real, which is very large and dark and has more heavily developed lashes, may represent a third species of this group.

A. triformellus Forbes (p. 163). A series of this species from San Germán tend strongly to a reddish ground, and may turn out to be *walsinghami* Möschler. Only a study of the genitalia of the type can settle the matter. In this species the white at the end of the cell is a single rounded dot, a diffuse patch, or absent. Fresh specimens of the light form may show a distinct rosy costa. All the metatarsi have distinct hair-tufts on the upper side.

Acrolophus (Acrolophus) harparsen new species

1892. *Acrolophus vitellus* Walshingham, Proc. Zool. Soc. 1891, p. 512, pl. xli, fig. 11 (male genitalia) (P. R. record).

1897. *Acrolophus vitellus* Walsingham, Proc. Zool. Soc. 1897, p. 173 (P. R. record).

(not *Acrolophus vitellus* Poey, from Cuba)

Eyes hairy, as in the group *Pseudanaphora,* but unlike the remaining Porto Rican species of Acrolophus; with a horizontal fan-like tuft of bristles in front of the eye, as in *A. arcanellus.* Antenna short, broad and simple, not serrate; palpi turned back to rear of thorax, second segment with a spreading tuft at tip, third with a triangular tuft on the upper (morphologically ventral or posterior) side, this tuft larger and looser than in *A. triformellus.* Lashes behind eye strong, normal. Fore and middle tibiæ short, with dense tufts on outer sides, fore tarsi merely thick-scaled, mid-tarsi close-scaled; hind tibiæ densely hairy as usual, the first two segments of tarsi also with dorsal hair. Fore wing with all veins separate. Female with palpi porrect, the first two segments triangularly scaled, and third broadened below; fan of lashes in front of eye weaker than in male, and disappearing in rubbed material; male genitalia (pl. xlvii fig. 45) with uncus simple but minutely bifid at tip, gnathos simple, penis with two spines, and valve broad and upcurved.[1]

Male dull dark fuscous brown, in faded specimens wood brown, obscurely mottled and transversely striate; with vague darker spots in middle and near end of cell, and triangular spots extending down cross cell near base and at middle, alternating with the dark spots in cell; the basal of these two triangles defined on outer side only, and both diffuse above. Region beyond cell paler, the subterminal region vaguely darker; costal edge with about a dozen dark striæ; fringe concolorous. Hind wing very slightly grayer; the concolorous fringe with a fine pale basal line. *Female* fore wing with ground paler, the brown spots in cell and triangles across fold contrasting, the striæ on costa narrower and darker, and the pale and dark outer part of the wing separated by a nearly straight diagonal boundary running to the apex. Male 20 mm., female 28 mm.

Porto Rico: Lares, Nov. (Seín; type and paratype male); San Juan (reported as *mimasalis* Walker ?); Río Piedras, Apr. 21 (flown female); also a series in collection of the Insular Experiment Station, presumably from Río Piedras, fresh but faded. Cornell Univ., type no. 1070.

[1] In the species which I identify as the true *vitellus* (pl. XLVII, fig. 46) from Habana, the uncus and gnathos are both double, and one of the two penial spines is minute. Another species in the National Museum from Santiago must also be considered, but seems to me less likely to be the true *vitellus.* It has the uncus and gnathos double, but with the lobes in contact, the valves hooked at the tip, and penis bifid with a single massive spine. The Porto Rican species appears so far not to occur on Cuba at all.

A. ochraceus Möschler (p. 162). Río Piedras, Apr. 23, Santurce, Apr. 15, Cataño, May 16 (Leonard and Mills).

Megalopygidæ

Megalopyge krugii Dewitz (p. 166). Coamo Springs, Apr. 7, Dorado, June 30 (Hoffman), Cataño, July 24 (Leonard and Mills).

Nepticulidæ

Nepticula gossypii Forbes and Leonard (p. 168). South coast from Guayanilla to Yauco (mines, and imagoes bred by Leonard), Apr.

Nepticula species. Coamo Springs, Apr. 9.

Explanations of the Figures

Plate XLIII

Venations

Fig. 1. *Heligmocera calvifrons* female.
Fig. 2. *Saphenista multistrigata*
Fig. 3. *Stilbosis phaeoptera*
Fig. 4. *Eriphia pernigrella*
Fig. 5. *Aphanosara planistes*
Fig. 6. *Tholerostola evippella*
Fig. 7. *Anacampsis bifuscella*
Fig. 8. *Stegasta capitella*
Fig. 9. *Schistonoea fulvidella*

Plate XLIV

Venations

Fig. 11. Tineidae: new genus, new species
Fig. 12. *Homostinea tischeriella*
Fig. 13. *Achanodes antipathetica*
Fig. 14. *Infurcitinea palpella*
Fig. 15. *Tinea familiaris*
Fig. 16. *Mea incudella*
Fig. 17. *Mea*, new species
Fig. 18. *Protodarcia bicolorella*
Fig. 19. *Protodarcia argyrophaea*
Fig. 20. *Protodarcia plumella*

Plate XLV

Male Genitalia

Fig. 21. *Olethreutes anthracana,* ventral view, opened out
Fig. 22. *Gymnandrosoma trachycerus,* same
Fig. 23. *Heligmocera calvifrons,* same
Fig. 24. *Epinotia unica,* same
Fig. 25. *Saphenista lepidulana,* same; penis figured separately
Fig. 26. *Saphenista semistrigata,* same
Fig. 27. *Saphenista multistrigata,* same
Fig. 28. *Phalonia subolivacea,* same

Plate XLVI

Genitalia

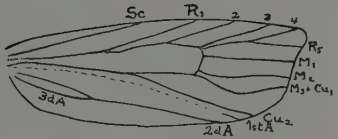
Fig. 29. *Eriphia pernigrella* male; general view from ventral side—cleared but not dissected, to show position of organs
Fig. 30. *E. pernigrella;* main part of genitalia, opened up on the right side and spread out
Fig. 31. *E. pernigrella,* penis
Fig. 32. *E. pernigrella;* dorsal half of 7th abdominal segment
Fig. 33. *E. pernigrella;* ventral half of 7th abdominal segment
Fig. 34. *E. curvipunctella* male; eighth segment opened out latero-ventrally, uncovering the true genitalia in ventral view
Fig. 35. *E. quinquepunctata;* male; ventral view, showing parts in position; to the same scale as fig. 29.
Fig. 36. *E. pernigrella* female, ventral view
Fig. 37. *Aphanosara planistes* male, lateral view
Fig. 38. *Glaucacna iridea* male, ventral view opened out, penis omitted
Fig. 39. *G. iridea* male, penis and associated sclerite (juxta ?)

Plate XLVII

Male genitalia

Fig. 40. *Aristotelia vagabundella,* side view, with eversible tufts on eighth segment
Fig. 41. *A. vagabundella,* somewhat larger scale, showing details
Fig. 42. *Aristotelia diolcella,* side view
Fig. 43. *Aristotelia lignicolora;*—the penis is drawn to the same scale
Fig. 44. *Aristotelia absconditella,* valve and penis (U. S.: Conn.)
Fig. 45. *Acrolophus harpersen* (*vitellus,* Walsingham). Side view; the uncus and gnathos are unpaired. Porto Rico.
Fig. 46. *Acrolophus* sp. from Habana, Cuba. Perhaps the true *vitellus:* ventral view, opened out, showing the double uncus and gnathos.

PLATE XLIII



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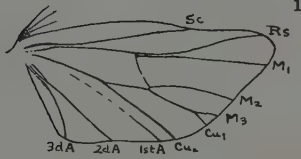

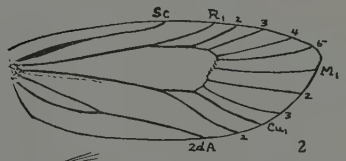

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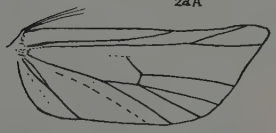
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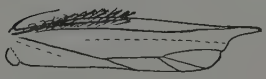

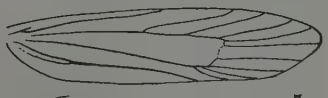
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PLATE XLIV

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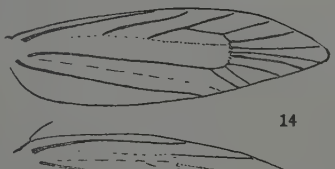
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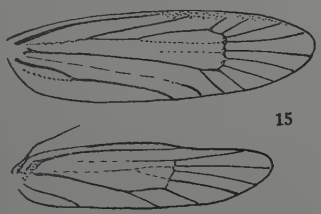
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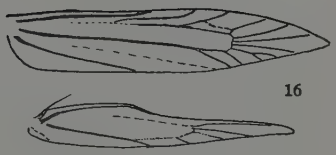
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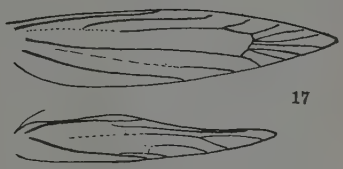
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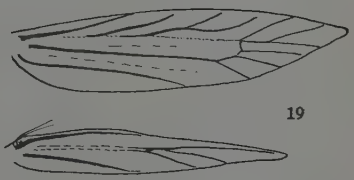
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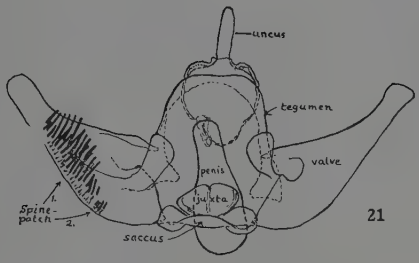
PLATE XLV



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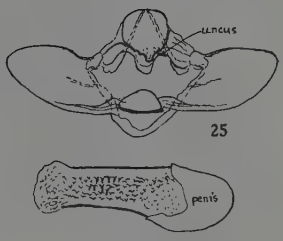

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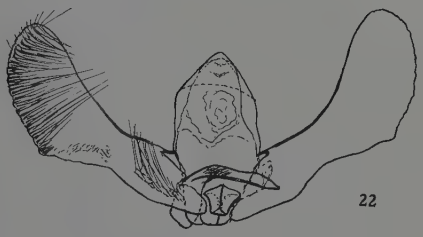
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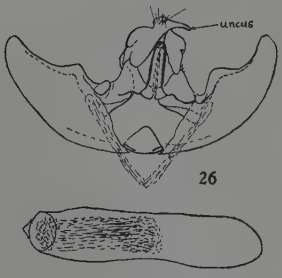

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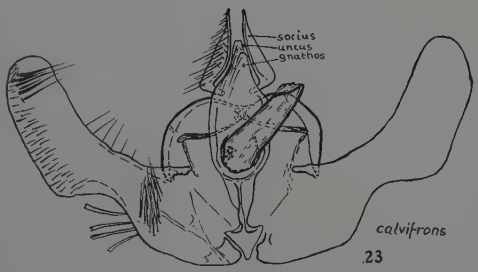

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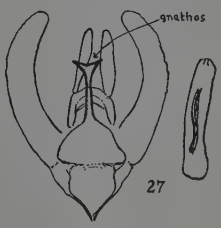

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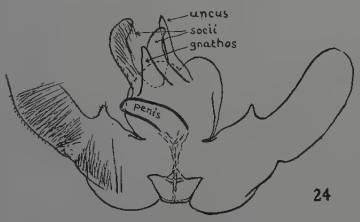

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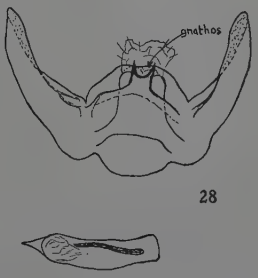

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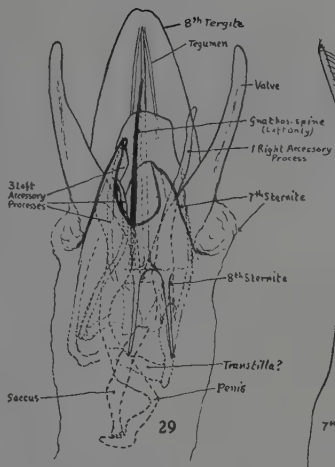
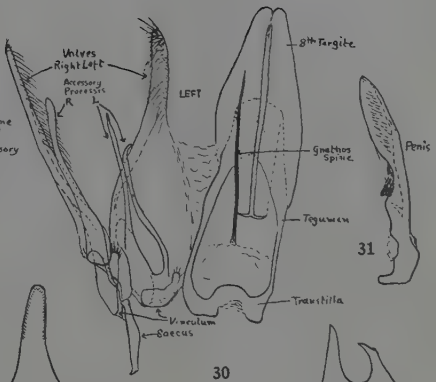
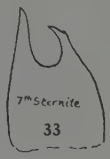
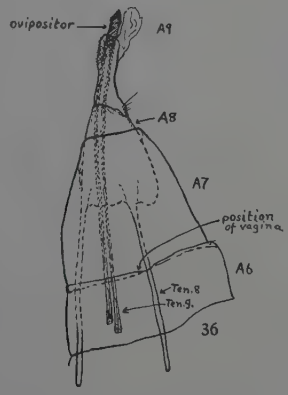
PLATE XLVI


8th Tergite
Tegumen
Valve
Gnathos spine (Left only)
Right Accessory Process
3 Left Accessory Processes
7th Sternite
8th Sternite
Transtilla?
Saccus
Penis
29

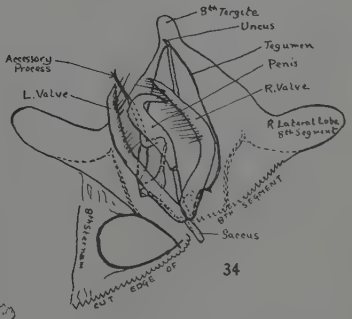

Valves
Right Left
Accessory Processes
R
L
LEFT
8th Tergite
Gnathos Spine
Tegumen
Transtilla
V. aculum
Saccus
30
Penis
31

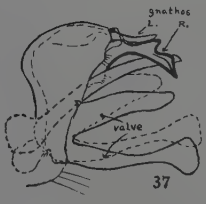
7th Tergite
32

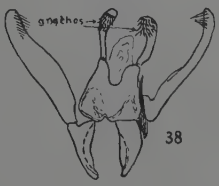

7th Sternite
33


ovipositor
A9
A8
A7
position of vagina
A6
Ten.8
Ten.9
36

39


8th Tergite
Uncus
Tegumen
Penis
R. Valve
Accessory Process
L. Valve
R Lateral Lobe 8th Segment
Saccus
34


gnathos
L.
R.
valve
37


gnathos
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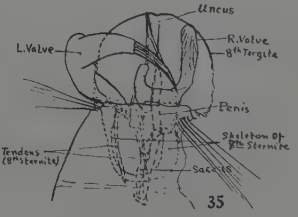
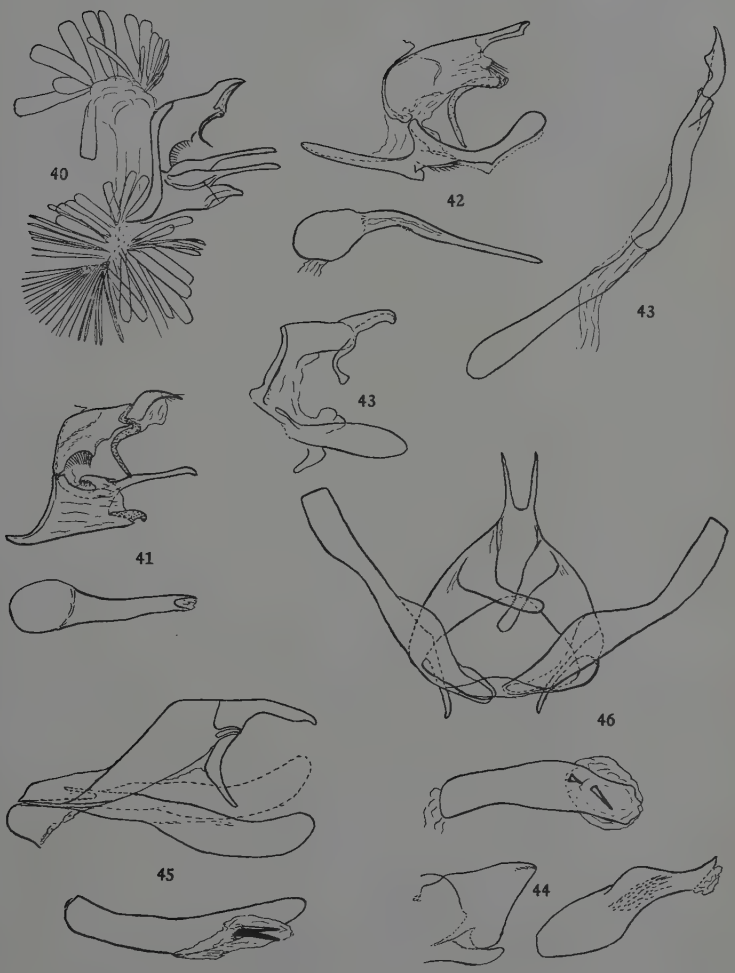

Uncus
L. Valve
R. Valve
8th Tergite
Penis
Tendons (8th sternite)
Skeleton of 8th Sternite
Saccus
35

PLATE XLVII



THE INFESTATION OF YOUNG OKRA PODS BY PINK BOLLWORM IN PORTO RICO

By George N. Wolcott, Entomologist, Isabela Sub-Station.

Summary: Infestation by *Pectinophora gossypiella* Saunders of tender young okra pods, not more than three inches long, nor more than three days old, occurs in Porto Rico when the okra plants are close to cotton fields maturing bolls which are heavily or totally infested by pink bollworm.

The average annual rainfall in the northwestern corner of Porto Rico is usually sufficient so that most of the agricultural crops of the Island could be grown there if the distribution of the rainfall thruout the year was not so uneven, and the periods when most of it occurs were not so uncertain. During the last few years, irrigation water has been available in this section, the Isabela Irrigation District, but the extremely low and unsatisfactory prices received by growers for cotton and sugarcane, the main crops of the region, make desirable the introduction of other more profitable crops.

One of the most promising developments appears to be the production of vegetables for the winter market in New York, and several kinds of vegetables have already been grown here, and exported on a small scale. Among others which gave promise of being profitable was okra, but the importation of okra pods from Porto Rico into continental United States is prohibited by federal quarantine. As the market demands for okra require pods to be not more than three inches long, it seemed possible that such tender and recently developed pods might escape infestation by the pink bollworm, *Pectinophora gossypiella* Saunders. Thus, an investigation for the collection of pertinent data seemed desirable, looking towards the possible formulation of a request for a modification of this quarantine.

The sole record of infestation by pink bollworm of okra pods in Porto Rico (1), at the time the writer commenced work on vegetable insects this spring, was that made by Mr. J. D. More at Humacao in 1921, when pink bollworm was first discovered in the Island. The Plant Quarantine and Control Administration agents stationed in Porto Rico for a number of years since had added nothing but negative evidence to this lone record, and it seemed likely that infestations were most exceptional. The illustration of caterpillars in pods, given by Loftin in his publication on this insect in Mexico (2) were of large, mature pods, and when questioned in person, he stated that

he had no remembrance of finding the larvae in the smaller pods. Several okra pods examined at various points between Isabela and Aguadilla, at a time when cotton plants had not yet begun to mature bolls, gave further negative evidence. Indeed the first positive indication that okra might be infested was an observation made at the opposite end of the Island.

While making examinations of cotton bolls to determine the amount of infestation by pink bollworm, in one rather extensive planting near the beach east of Loíza Viejo, infestation was found to be not only total for the bolls, but so heavy that all the bolls were destroyed. The grower explained that the first crop of cotton grown here had been so excellent and profitable that he had promptly followed it with another planting immediately after plowing up the first, which, most inexplicably to him, had proved to be a complete failure. By thus having no non-cotton season, he had built up such a large population of pink bollworm in this comparatively isolated region that it was not surprising to find that a single okra plant nearby with mature green pods was infested with its caterpillars, four pods having one larva each, and one pod containing two caterpillars. This observation, however, represented a most exceptional condition, and none of the smaller pods were infested, even of this plant in the midst of a large moth population presumably experiencing the greatest difficulty in finding suitable hosts for oviposition. Yet it indicated possibilities, which were later confirmed by Messrs. Mills and Berry, of the Plant Quarantine and Control Administration, who are unofficially reported to have found ten out of sixteen pods of okra infested at Trujillo Alto in a small planting adjacent to a cotton field known to be heavily infested with pink bollworm.

The real point at issue, however, had not been determined: whether the immature green pods would be infested. Observations made at the Isabela Sub-Station indicated that pods attained the maximum marketable size in three days from the dropping of the corolla, and ordinarily pods must be picked every other day to keep them from becoming too tough to be acceptable to the market. The period when they might possibly become infested before being picked was so short that it was thought that in commercial plantings infestations would not occur. To determine this point with certainty, a considerable planting of okra was made, consisting of a row around the cotton fields of two demonstration farms of the district, at Maleza and at Bejucos. The cotton on both of these farms was beginning to mature at the time the okra was planted, and while it was known to be infested with pink bollworm, these infestations were supposed to be

representative of near-by commercial cotton fields, and of the district as a whole.

The farm at Bejucos is in the midst of a cotton district, and later observations have indicated that pink bollworm was not exceptionally abundant there. The farm at Maleza, however, is in a region previously devoted largely to growing hat palms, and while scattered patches may be planted to cotton, the farmers generally know little about its culture. It is presumed that no care had been taken at the end of the previous crop season to destroy old cotton plants from one of these near-by patches, and the fertilized cotton of the demonstration farm was noted to be heavily infested with pink bollworm as soon as it began to mature bolls. By the time that the okra plants began to form pods, infestation of cotton bolls by pink bollworm was total. Nevertheless, the first two pods of okra attaining marketable size at Maleza were free from pink bollworm injury, as were the next fifty, nor were eggs observed on any of them.

The next collection of okra pods from Maleza was made July 30th, but their examination was not commenced until August 1st, and the smallest pods were not cut open until the 3d. The longest of these pods were 5 inches in length, 20 out out of the total of 176 being from 5 to 4.5 inches long, 20 from 4.5 to 4 inches, and 20 from 4 to 3.5 inches long, but the remainder were of the most desirable marketable size, or even smaller, being less than 3 inches long in some cases. In two of the largest pods larvae already beginning to turn pink were found. Smaller caterpillars were found in the younger pods, but the percentage of infestation did not greatly decrease with a decrease in the size and presumptive age of the pods. For the total collection, infestation was about 6 per cent. Observations made five days later at Maleza gave results practically identical with those previously obtained there: an infestation of about 6 per cent. From over a hundred pods collected there the next day, of which the majority were examined, only one was found infested with pink bollworm, but this pod was only two and a half inches long.

In the meantime okra pods attained marketable size at Bejucos and indeed had grown so luxuriantly that some of those of tender age were much too large, some of them being seven inches long. Despite their large size, none were infested with pink bollworm (Aug 3d). Five days later, all of one hundred pods, from six to three inches long, were free from pink bollworm injury.

These results would appear to indicate that, while under ordinary conditions, infestation of okra pods does not occur even in the midst of cotton fields with normal pink bollworm infestations, even the

youngest pods may become infested when near-by cotton is heavily infested. Such heavy infestations in cotton fields may be so readily built up by inexperienced or careless growers as to constitute a perpetual threat to commercial okra production. Naturally, of course, any reasonable hope of expecting possible changes in quarantine regulations governing okra must be abandoned.

REFERENCES CITED:

1. **Wolcott, G. N.** Insectae Portoricensis. Jour. Dept. Agr. P. R., Vol. 7, No. 1, pp. 313. San Juan, January, 1923. (see p. 202.)

2. **Loftin, U. C., McKinley, K. B. & Hanson, W. K.** Report on Investigations of the Pink Bollworm of Cotton in Mexico. U. S. Dept., Agr. Bull. No. 918, pp. 64, fig. 11, pl. 5. April 19, 1921.

A NEW SPECIES OF ARISTELLIGER FROM NAVASSA

CHAPMAN GRANT, Major, U. S. Army

Aristelliger cochranae sp. nov.

Type: No. 2320, male, Chapman Grant Collection. 30 May, 1931. Navassa Island; Collector, Crew of L.H.T. "Acacia".

Diagnosis: A gecko of moderate size, the basal half of each digit expanded and provided beneath with unpaired lamellae, the distal half of the larger digits compressed, curved and provided with a claw at the tip; upper side and chin covered with small granules; underside from neck to tip of tail covered with larger imbricated smooth scales. No femoral pores. A distinct black spine on vestiginal eyelid, twice the length of head granules. Body longitudinally striped. Tail cross barred.

Habitat: Navassa Island, off the S W tip of Santo Domingo.

Proportions: Adult, 50 mm. snout to vent. 65 mm. vent to tip of tail. Center of eye slightly in front of center between ear and snout. Ear diamond shaped; as large as first infralabial. Angle of mouth turns up behind eye, then horizontal again. Head broader than neck. Legs short and thick, femoral joint equal to snout to center of eye. Tail round, firm, strong. Eye large, pupil vertical; edges of pupil smooth, not wavy.

Squamation: Rostral deeply creased centrally almost to lip; extends slightly over and laterally on snout. A pair of internasals, separated by one or three scales. Nostril lateral, touching rostral, internasal and postnasal which in turn lies on first supralabial. Ten supralabials; seven and a half to center of eye. Mental, a quadrant. Eight infralabials, first three about half depth of mental. Two postmentals form a right angle inclosing base of mental, followed laterally by two more scales each one half the size of the one preceding. Three or four rows of slightly enlarged, elongated scales border the infralabials. Remainder of throat to neck, covered with small granules. Neck to tip of tail, covered with somewhat larger, smooth, imbricated scales. A barely discernible escutcheon of slightly concave scales anterior to vent of males. All upperside covered with granules, about eleven in diameter of eye. A distinct black spine, occasionally two, on vestiginal eyelid, twice the length of head granules. Legs and feet covered with granules similar to back. The basal half

of each digit expanded and provided beneath with eight or nine unpaired lamellae forming an oval followed by narrower lamellae to base of digit. The distal half of the larger digits compressed, curved, and provided with a claw at the tip.

Color and markings: Above, brown; dark stripe bordered with light from snout, crosses eye and runs to shoulder on female and to sacrum on male. Tail bears about nine narrow dark crossbands followed by light bands of the same width, more pronounced on males. Sides marbled. Chin of male marbled; of female white. Belly light or white. Underside tail; female, white; male, dark. Digit pads ash. A regenerated tail is diagonally penciled with jagged lines. Color of young specimen: Snout to vent 20 mm. Beginning at nape, seven light diamonds to sacrum, ten on tail. Dark stripe from snout crosses eye and is then broken outlining diamonds. The young have a decidedly checkered appearance in contrast to the striped adults. The change is apparent through medium-sized specimens.

My small series of seven adult to medium sized and six young make it impossible to state definitely whether there is a fixed sexual dichromatism.

Remarks: Named in honor of Doris M. Cochran.

EXPLANATION OF PLATE NO. XLVIII

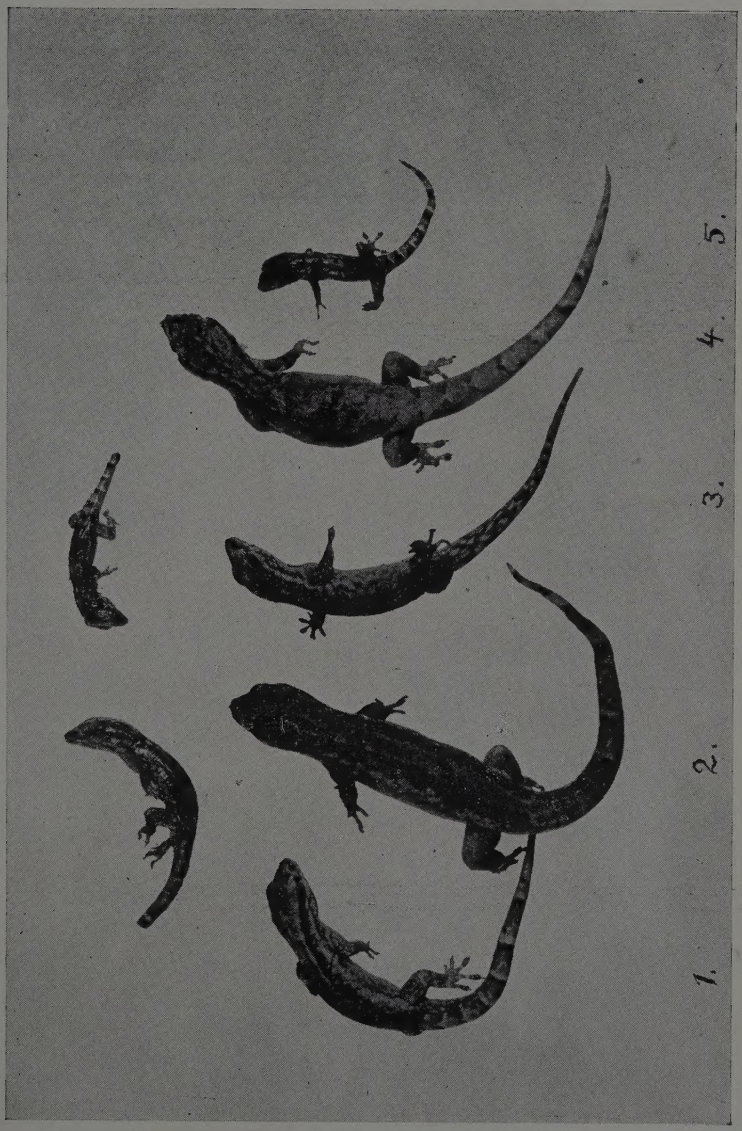
Aristelliger cochranae sp. nov.

1. Medium sized male.
2. Adult male. Note full-length stripes.
3. Note pattern of regenerated tail.
4. Adul female. Note stripes stopping at shoulder.
5. Young. Note checkered pattern.

Illustrations life size.

o–O–o

PLATE XLVIII.



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